STIC Search Report
EIC 1700

STIC Database Tracking Number: 191636

TO: Ben Sackey
Location: REM 5B31
Art Unit : 1626
June 5, 2006

Case Serial Number: 10/798131

From: Kathleen Fuller
Location: EIC 1700
REMSEN 4B28
Phone: 571/272-2505
Kathleen.Fuller@uspto.gov

Search Notes

Miss Fuller

Access DB# 191636

SEARCH REQUEST FORM

Scientific and Technical Information Center

Requester's Full Name: BEN SACKEY Examiner #: 73489 Date: 5/31/06
Art Unit: 1626 Phone Number ~~30~~ 2-0704 Serial Number: 10/798,131
Mail Box and Bldg/Room Location: Rem 5B31 Results Format Preferred (circle): PAPER DISK E-MAIL

If more than one search is submitted, please prioritize searches in order of need.

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Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc, if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

Title of Invention: Synthetic methods for prep. procyanidin oligomers

Inventors (please provide full names): Romanczyk et al.

Earliest Priority Filing Date: 04/15/1999

For Sequence Searches Only *Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.*

A process for prep. a partially protected procyanidin dimer which comprises:

(a) protecting each phenolic hydroxyl groups of epicatechin or catechin monomer

(b) activating the monomer from step (a) by introducing an acyloxy group at the C4 position

(c) catalytically coupling the monomer from step (b) with an unprotected epicatechin or catechin monomer, optionally having a halo blocking group at C8 position to form partially protected procyanidin dimer.

Thanks

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STAFF USE ONLY

Searcher: K. Fuller
Searcher Phone #:
Searcher Location:
Date Searcher Picked Up:
Date Completed: 6/5/06
Searcher Prep & Review Time: 40
Clerical Prep Time:
Online Time: 24

Type of Search

NA Sequence (#)
AA Sequence (#)
Structure (#) 2
Bibliographic
Litigation
Fulltext
Patent Family
Other

Vendors and cost where applicable

STN ✓
Dialog
Questel/Orbit
Dr.Link A
Lexis/Nexis
Sequence Systems
WWW/Internet N
Other (specify) ✓

PTO-1590 (8-01)

=> FILE REG
FILE 'REGISTRY' ENTERED AT 15:08:41 ON 05 JUN 2006
USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.
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Property values tagged with IC are from the ZIC/VINITI data file
provided by InfoChem.

STRUCTURE FILE UPDATES: 4 JUN 2006 HIGHEST RN 886746-35-6
DICTIONARY FILE UPDATES: 4 JUN 2006 HIGHEST RN 886746-35-6

New CAS Information Use Policies, enter HELP USAGETERMS for details.

TSCA INFORMATION NOW CURRENT THROUGH January 6, 2006

Please note that search-term pricing does apply when
conducting SmartSELECT searches.

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*
* The CA roles and document type information have been removed from *
* the IDE default display format and the ED field has been added, *
* effective March 20, 2005. A new display format, IDERL, is now *
* available and contains the CA role and document type information. *
*
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REGISTRY includes numerically searchable data for experimental and
predicted properties as well as tags indicating availability of
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=> FILE HCAPLU
FILE 'HCAPLUS' ENTERED AT 15:08:46 ON 05 JUN 2006
USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.
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FILE COVERS 1907 - 5 Jun 2006 VOL 144 ISS 24
FILE LAST UPDATED: 4 Jun 2006 (20060604/ED)

New CAS Information Use Policies, enter HELP USAGETERMS for details.

This file contains CAS Registry Numbers for easy and accurate substance identification.

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=> D QUE
L2            46 SEA FILE=REGISTRY ABB=ON  (100-39-0/BI OR 108-24-7/BI OR
                 109-72-8/BI OR 127-19-5/BI OR 137550-05-1/BI OR 137624-11-4/BI
                 OR 14221-01-3/BI OR 154-23-4/BI OR 16198-01-9/BI OR 19183-30-3/
                 BI OR 195145-79-0/BI OR 20194-41-6/BI OR 20728-73-8/BI OR
                 223387-36-8/BI OR 223387-39-1/BI OR 29106-49-8/BI OR 29106-51-2
                 /BI OR 294203-72-8/BI OR 302789-10-2/BI OR 302789-11-3/BI OR
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                 -6/BI OR 302789-25-9/BI OR 302789-28-2/BI OR 302789-30-6/BI OR
                 302917-68-6/BI OR 490-46-0/BI OR 546-67-8/BI OR 594-19-4/BI OR
                 64-18-6/BI OR 64-19-7/BI OR 67-68-5/BI OR 68-12-2/BI OR
                 71-43-2/BI OR 79-09-4/BI OR 824-94-2/BI OR 87292-49-7/BI)
L3             2 SEA FILE=REGISTRY ABB=ON  L2 AND PROCYANIDIN
L4             1 SEA FILE=REGISTRY ABB=ON  "PROCYANIDIN A1"/CN
L5             1 SEA FILE=REGISTRY ABB=ON  EPICATECHIN/CN
L6             2 SEA FILE=REGISTRY ABB=ON  CATECHIN/CN
L7             1 SEA FILE=REGISTRY ABB=ON  L2 AND L6
L8             1 SEA FILE=REGISTRY ABB=ON  L5 AND L2
L9           713 SEA FILE=HCAPLUS ABB=ON  L3 OR L4
L10         2138 SEA FILE=HCAPLUS ABB=ON  L9 OR PROCYANIDIN?
L11          218 SEA FILE=HCAPLUS ABB=ON  L10(L)PREP/RL
L12         8348 SEA FILE=HCAPLUS ABB=ON  L7 OR L8
L13        12211 SEA FILE=HCAPLUS ABB=ON  L12 OR EPICATECHIN? OR CATECHIN?
L14          594 SEA FILE=HCAPLUS ABB=ON  L13(L)RCT/RL
L15           34 SEA FILE=HCAPLUS ABB=ON  L11 AND L14
L16            7 SEA FILE=HCAPLUS ABB=ON  L15 AND ACETYLA?
L17           20 SEA FILE=HCAPLUS ABB=ON  L15 AND OLIGOMER?
L18           25 SEA FILE=HCAPLUS ABB=ON  L16 OR L17
L19            9 SEA FILE=HCAPLUS ABB=ON  L15 NOT L18
L20           34 SEA FILE=HCAPLUS ABB=ON  L18 OR L19

=> D L20 BIB ABS IND HITSTR 1-34

L20  ANSWER 1 OF 34  HCAPLUS  COPYRIGHT 2006 ACS on STN
AN   2006:164206  HCAPLUS
DN   144:403719
TI   Tetramethylated Dimeric Procyanidins Are Detected in Rat Plasma and Liver
     Early after Oral Administration of Synthetic Oligomeric
     Procyanidins
AU   Garcia-Ramirez, Bernardino; Fernandez-Larrea, Juan; Salvado, M. Josepa;
     Ardevol, Anna; Arola, Lluis; Blade, Cinta
CS   Departament de Bioquimica i Biotecnologia CeRTA, Universitat Rovira i
     Virgili, Tarragona, 43007, Spain
SO   Journal of Agricultural and Food Chemistry (2006), 54(7), 2543-2551
     CODEN: JAFCAU; ISSN: 0021-8561
PB   American Chemical Society
DT   Journal
LA   English
AB   Procyanidins (PC) are of great interest in nutrition because they account
     for a major fraction of the total flavonoids ingested in Western diets and
     have health benefits in humans. However, it remains unknown which species
     of PC, namely, monomers, oligomers, or aromatic acid derivs. of gut
     microflora, are responsible for their beneficial effects in vivo. The
     high mol. complexity of PC exts. and PC-rich foods is a major problem in
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absorption studies. To circumvent this difficulty, we have synthesized **oligomeric** PC consisting of (-)-epicatechin units linked by Et bridges. The synthetic PC (SPC) only contains dimers, trimers, tetramers, and nanomers. After oral gavage of this SPC (200 mg/kg body weight) to male Wistar rats, tetramethylated dimeric PC (TDPC) were detected in plasma and liver. TDPC were detected in plasma as soon as 1 h after intake, reaching maximum concns. (14 mg/L) 2 h after gavage. At this time, liver contained as much as 15 μg of TDPC per g of tissue. In conclusion, orally administered dimeric PC are rapidly absorbed and internally methylated in rats. To our knowledge, this is the first time that methylated dimeric PC have been detected in plasma and liver. We consider that plasma and liver concns. of TDPC are sufficient to exert a hormone-like effect and, therefore, that PC dimers are good candidates as agents of the biol. activities of PC exts. and PC-rich foods.

CC 1-2 (Pharmacology)
Section cross-reference(s): 63

ST tetramethylated dimeric procyanidin blood liver **oligomeric**

IT Drug delivery systems
(oral; tetramethylated dimeric procyanidins are detected in rat plasma and liver early after oral administration of synthetic **oligomeric** procyanidins)

IT Blood analysis
Hepatotoxicity
Human
(tetramethylated dimeric procyanidins are detected in rat plasma and liver early after oral administration of synthetic **oligomeric** procyanidins)

IT **Procyanidins**
RL: BSU (Biological study, unclassified); PAC (Pharmacological activity); PKT (Pharmacokinetics); SPN (Synthetic preparation); THU (Therapeutic use); BIOL (Biological study); **PREP (Preparation)**; USES (Uses)
(tetramethylated dimeric **procyanidins** are detected in rat plasma and liver early after oral administration of synthetic **oligomeric procyanidins**)

IT 883719-82-2P
RL: BSU (Biological study, unclassified); PAC (Pharmacological activity); PKT (Pharmacokinetics); SPN (Synthetic preparation); THU (Therapeutic use); BIOL (Biological study); **PREP (Preparation)**; USES (Uses)
(tetramethylated dimeric **procyanidins** are detected in rat plasma and liver early after oral administration of synthetic **oligomeric procyanidins**)

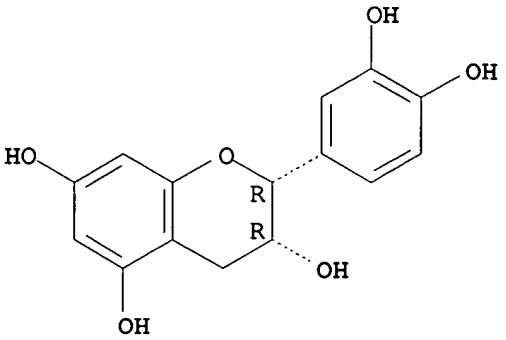
IT **490-46-0**, (-)-**Epicatechin**
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(tetramethylated dimeric procyanidins are detected in rat plasma and liver early after oral administration of synthetic **oligomeric** procyanidins)

IT **490-46-0**, (-)-**Epicatechin**
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(tetramethylated dimeric procyanidins are detected in rat plasma and liver early after oral administration of synthetic **oligomeric** procyanidins)

RN 490-46-0 HCAPLUS

CN 2H-1-Benzopyran-3,5,7-triol, 2-(3,4-dihydroxyphenyl)-3,4-dihydro-, (2R,3R)- (9CI) (CA INDEX NAME)

Absolute stereochemistry. Rotation (-).



RE.CNT 53 THERE ARE 53 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L20 ANSWER 2 OF 34 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2005:1313947 HCAPLUS
DN 144:40753
TI Procyanidin dimer digallates modulating nitric oxide production and vasorelaxation for the treatment of hypertension and vascular disorders and kidney failure
IN Schmitz, Harold H.; Kwik-Uribe, Catherine L.; Kelm, Mark A.; Hammerstone, John F.; Romanczyk, Leo J.
PA Mars, Incroporated, USA
SO U.S. Pat. Appl. Publ., 32 pp.
CODEN: USXXCO
DT Patent
LA English
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI US 2005277600	A1	20051215	US 2005-153698	20050614
WO 2005123096	A2	20051229	WO 2005-US20961	20050614

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW
RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

PRAI US 2004-579303P P 20040614

AB The invention relates to compns., such as pharmaceuticals, foods, food additives, or dietary supplements, containing procyanidin dimer digallates, such as EC-(4β→8)-C digallate, C-(4α→8)-C digallate, C-(4β→8)-C digallate, and C-(4β→8)-EC digallate (EC means epicatechin and C means catechin). These dimer digallates comprises an alpha linkage between the monomeric units, for example, 4α→8 linkage. The invention also relates to methods of use thereof, for prophylactic or therapeutic treatment of a human or a veterinary animal to treat or prevent NO-responsive health conditions, treat hypertension, cardiovascular disease, coronary artery disease, diabetes, cognitive dysfunction or disorder and/or vascular circulation

disorders, prevent or reduce the risk of heart attack, stroke, congestive heart failure and/or kidney failure, or to improve blood flow, for example renal blood flow. The composition may optionally contain an addnl. NO modulating agent and/or a vascular-protective or therapeutic agent, or may be administered in combination with such an agent.

IC ICM A61K031-7048
ICS A61K031-353
INCL 514027000; 514456000
CC 63-5 (Pharmaceuticals)
Section cross-reference(s): 1, 13, 17, 18
ST nitric oxide modulation procyanidin dimer digallate prepn pharmaceutical food
IT Animal cell line
(HUVEC, NO production in, modulation using procyanidin dimer digallates; procyanidin dimer digallates modulating nitric oxide production and vasorelaxation for treatment of hypertension and vascular disorders and kidney failure)
IT Heart
(aortic valve, pre-contracted aortic ring, relaxation using procyanidin dimer digallates; procyanidin dimer digallates modulating nitric oxide production and vasorelaxation for treatment of hypertension and vascular disorders and kidney failure)
IT Heart, disease
(attack; procyanidin dimer digallates modulating nitric oxide production and vasorelaxation for treatment of hypertension and vascular disorders and kidney failure)
IT Artery, disease
(coronary; procyanidin dimer digallates modulating nitric oxide production and vasorelaxation for treatment of hypertension and vascular disorders and kidney failure)
IT Circulation
(disorder; procyanidin dimer digallates modulating nitric oxide production and vasorelaxation for treatment of hypertension and vascular disorders and kidney failure)
IT Heart, disease
Kidney, disease
(failure; procyanidin dimer digallates modulating nitric oxide production and vasorelaxation for treatment of hypertension and vascular disorders and kidney failure)
IT Antidiabetic agents
Antihypertensives
Antiobesity agents
Blood vessel, disease
Cardiovascular agents
Cardiovascular system, disease
Diabetes mellitus
Drug delivery systems
Human
Hypercholesterolemia
Hypertension
Kidney, disease
Obesity
Tobacco smoke
Vasodilators
(procyanidin dimer digallates modulating nitric oxide production and vasorelaxation for treatment of hypertension and vascular disorders and kidney failure)
IT **Procyanidins**
RL: NPO (Natural product occurrence); PAC (Pharmacological activity); PUR (Purification or recovery); SPN (Synthetic preparation); THU (Therapeutic

use); BIOL (Biological study); OCCU (Occurrence); **PREP (Preparation)**; USES (Uses)
(**procyanidin** dimer digallates modulating nitric oxide production and vasorelaxation for treatment of hypertension and vascular disorders and kidney failure)

IT Arachis hypogaea
(skin of, A-type procyanidin extracted from; procyanidin dimer digallates modulating nitric oxide production and vasorelaxation for treatment of hypertension and vascular disorders and kidney failure)

IT Behavior
(smoking; procyanidin dimer digallates modulating nitric oxide production and vasorelaxation for treatment of hypertension and vascular disorders and kidney failure)

IT Brain, disease
(stroke; procyanidin dimer digallates modulating nitric oxide production and vasorelaxation for treatment of hypertension and vascular disorders and kidney failure)

IT 10102-43-9, Nitric oxide, biological studies
RL: BSU (Biological study, unclassified); BIOL (Biological study)
(procyanidin dimer digallates modulating nitric oxide production and vasorelaxation for treatment of hypertension and vascular disorders and kidney failure)

IT 149-91-7, Gallic Acid, biological studies 970-74-1, Epigallocatechin 989-51-5, Epigallocatechingallate 1257-08-5, Epicatechingallate 51196-37-3 51196-38-4 134054-57-2 152696-02-1 152696-03-2 152696-05-4 212066-01-8 220089-13-4 680593-76-4 680593-81-1 871017-72-0
RL: BSU (Biological study, unclassified); PAC (Pharmacological activity); THU (Therapeutic use); BIOL (Biological study); USES (Uses)
(procyanidin dimer digallates modulating nitric oxide production and vasorelaxation for treatment of hypertension and vascular disorders and kidney failure)

IT **12798-56-0P**, **Procyanidin** A1 41743-41-3P, **Procyanidin** A2
RL: NPO (Natural product occurrence); PAC (Pharmacological activity); PUR (Purification or recovery); THU (Therapeutic use); BIOL (Biological study); OCCU (Occurrence); **PREP (Preparation)**; USES (Uses)
(**procyanidin** dimer digallates modulating nitric oxide production and vasorelaxation for treatment of hypertension and vascular disorders and kidney failure)

IT 100-39-0, Benzyl bromide 107-21-1, Ethylene glycol, reactions **154-23-4**, (+)-**Catechin** 1486-48-2, Tri-O-benzylgallic acid
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(procyanidin dimer digallates modulating nitric oxide production and vasorelaxation for treatment of hypertension and vascular disorders and kidney failure)

IT 20728-73-8P **29106-49-8P** 79907-44-1P 87292-49-7P 87292-54-4P 223387-26-6P 223387-28-8P 871017-73-1P
RL: RCT (Reactant); SPN (Synthetic preparation); **PREP (Preparation)**; RACT (Reactant or reagent)
(**procyanidin** dimer digallates modulating nitric oxide production and vasorelaxation for treatment of hypertension and vascular disorders and kidney failure)

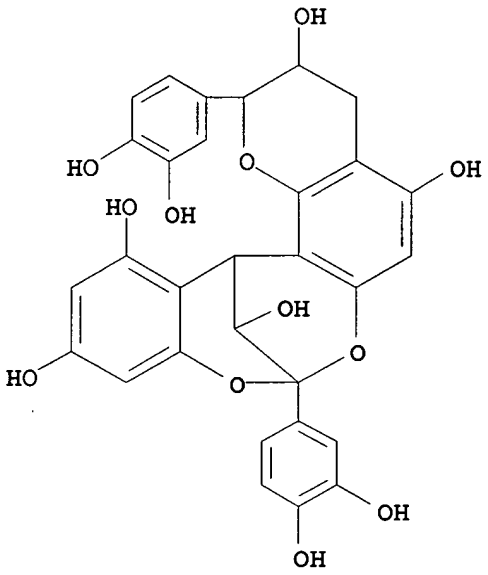
IT 298-93-1, MTT
RL: ANT (Analyte); ANST (Analytical study)
(reduction by procyanidin dimer digallate; procyanidin dimer digallates modulating nitric oxide production and vasorelaxation for treatment of hypertension and vascular disorders and kidney failure)

IT **12798-56-0P**, **Procyanidin** A1

RL: NPO (Natural product occurrence); PAC (Pharmacological activity); PUR (Purification or recovery); THU (Therapeutic use); BIOL (Biological study); OCCU (Occurrence); **PREP (Preparation)**; USES (Uses)
(**procyanidin** dimer digallates modulating nitric oxide production and vasorelaxation for treatment of hypertension and vascular disorders and kidney failure)

RN 12798-56-0 HCAPLUS

CN 8,14-Methano-2H,14H-1-benzopyrano[7,8-d][1,3]benzodioxocin-3,5,11,13,15-pentol, 2,8-bis(3,4-dihydroxyphenyl)-3,4-dihydro- (9CI) (CA INDEX NAME)



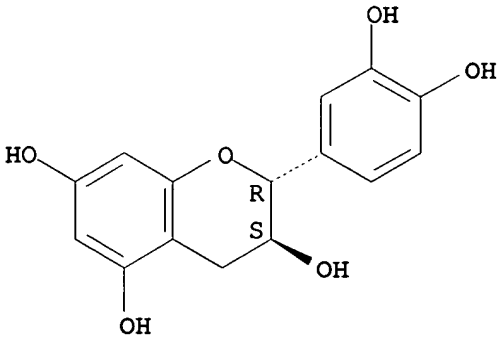
IT **154-23-4**, (+)-**Catechin**

RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(procyanidin dimer digallates modulating nitric oxide production and vasorelaxation for treatment of hypertension and vascular disorders and kidney failure)

RN 154-23-4 HCAPLUS

CN 2H-1-Benzopyran-3,5,7-triol, 2-(3,4-dihydroxyphenyl)-3,4-dihydro-, (2R,3S)- (9CI) (CA INDEX NAME)

Absolute stereochemistry. Rotation (+).



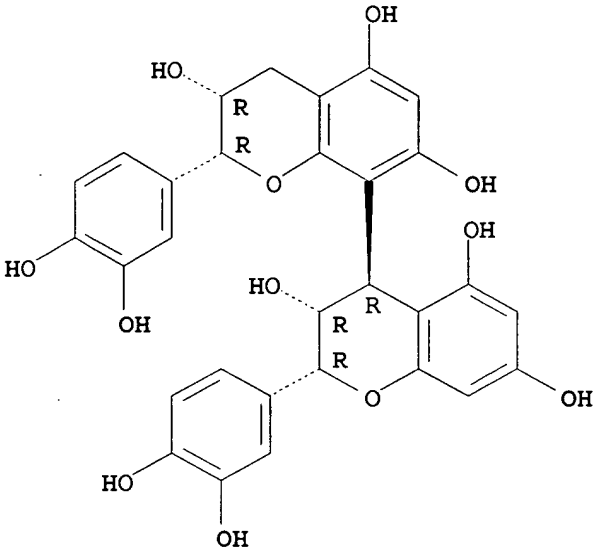
IT **29106-49-8P**

RL: RCT (Reactant); SPN (Synthetic preparation); **PREP**

(**Preparation**); RACT (Reactant or reagent)
(**procyanidin** dimer digallates modulating nitric oxide production and vasorelaxation for treatment of hypertension and vascular disorders and kidney failure)

RN 29106-49-8 HCAPLUS
CN [4,8'-Bi-2H-1-benzopyran]-3,3',5,5',7,7'-hexol, 2,2'-bis(3,4-dihydroxyphenyl)-3,3',4,4'-tetrahydro-, (2R,2'R,3R,3'R,4R)- (9CI) (CA INDEX NAME)

Absolute stereochemistry.



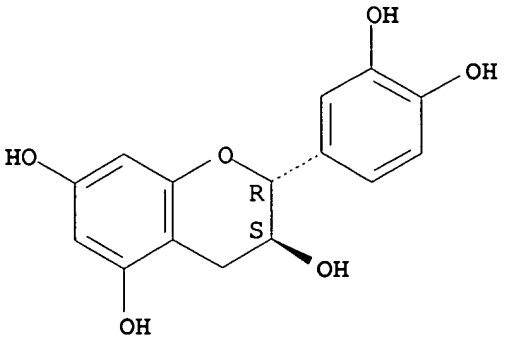
L20 ANSWER 3 OF 34 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2005:1066858 HCAPLUS
DN 143:410992
TI Manufacture of antiaging tablet from soybean isoflavone, ginsenoside and procyanidine
IN Wang, Jingang
PA Beijing Kexin Bicheng Pharmaceutical Technology Development Co., Ltd., Peop. Rep. China
SO Faming Zhuanli Shenqing Gongkai Shuomingshu, 14 pp.
CODEN: CNXXEV
DT Patent
LA Chinese
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	CN 1559420	A	20050105	CN 2004-10006415	20040302
PRAI	CN 2004-10006415		20040302		

AB The title tablet is manufactured from natural plant exts. such as soybean isoflavone (10-40 weight%), ginsenoside (1-60%) from ginseng stem and leaf, procyanidine (10-70%), cellulose (5-40%) and starch (5-30%) by mixing and tabletting. The tablet can also be served as a health food and has obvious immunity improving and anti-aging effects.
IC ICM A61K031-7048
ICS A61K009-28; A61P043-00
CC 63-6 (Pharmaceuticals)
ST antiaging tablet soybean isoflavone ginsenoside procyanidine

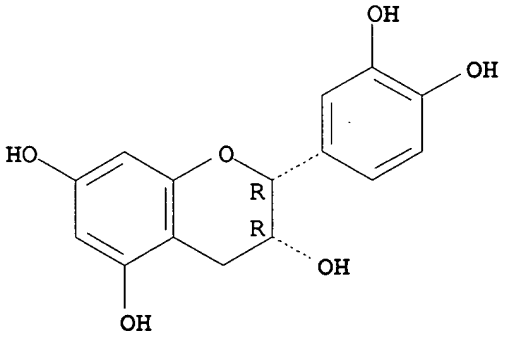
IT Flavones
RL: PAC (Pharmacological activity); THU (Therapeutic use); BIOL (Biological study); USES (Uses)
(isoflavones; manufacture of antiaging tablet from soybean isoflavone, ginsenoside and procyanidine)
IT Lipofuscins
RL: BSU (Biological study, unclassified); BIOL (Biological study)
(manufacture of antiaging tablet from soybean isoflavone, ginsenoside and procyanidine)
IT Ginsenosides
RL: PAC (Pharmacological activity); THU (Therapeutic use); BIOL (Biological study); USES (Uses)
(manufacture of antiaging tablet from soybean isoflavone, ginsenoside and procyanidine)
IT Drug delivery systems
(tablets; manufacture of antiaging tablet from soybean isoflavone, ginsenoside and procyanidine)
IT 542-78-9, Malondialdehyde 9013-66-5 9054-89-1, Superoxide dismutase
RL: BSU (Biological study, unclassified); BIOL (Biological study)
(manufacture of antiaging tablet from soybean isoflavone, ginsenoside and procyanidine)
IT 64-17-5, Ethanol, uses
RL: NUU (Other use, unclassified); USES (Uses)
(manufacture of antiaging tablet from soybean isoflavone, ginsenoside and procyanidine)
IT 290-87-9P, Cyanidine
RL: PAC (Pharmacological activity); SPN (Synthetic preparation); THU (Therapeutic use); BIOL (Biological study); **PREP (Preparation)**; USES (Uses)
(manufacture of antiaging tablet from soybean isoflavone, ginsenoside and **procyanidine**)
IT 529-59-9, Genistin 552-66-9, Daidzin 22427-39-0, Ginsenoside Rg1 52286-59-6, Ginsenoside Re
RL: PAC (Pharmacological activity); THU (Therapeutic use); BIOL (Biological study); USES (Uses)
(manufacture of antiaging tablet from soybean isoflavone, ginsenoside and procyanidine)
IT **154-23-4 490-46-0, Epicatechin**
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(manufacture of antiaging tablet from soybean isoflavone, ginsenoside and procyanidine)
IT 557-04-0, Magnesium stearate 9004-34-6, Cellulose, biological studies 9005-25-8, Starch, biological studies
RL: THU (Therapeutic use); BIOL (Biological study); USES (Uses)
(manufacture of antiaging tablet from soybean isoflavone, ginsenoside and procyanidine)
IT **154-23-4 490-46-0, Epicatechin**
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(manufacture of antiaging tablet from soybean isoflavone, ginsenoside and procyanidine)
RN 154-23-4 HCAPLUS
CN 2H-1-Benzopyran-3,5,7-triol, 2-(3,4-dihydroxyphenyl)-3,4-dihydro-, (2R,3S)- (9CI) (CA INDEX NAME)

Absolute stereochemistry. Rotation (+).



RN 490-46-0 HCAPLUS
CN 2H-1-Benzopyran-3,5,7-triol, 2-(3,4-dihydroxyphenyl)-3,4-dihydro-, (2R,3R)- (9CI) (CA INDEX NAME)

Absolute stereochemistry. Rotation (-).



L20 ANSWER 4 OF 34 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2005:974166 HCAPLUS
DN 143:427069
TI Efficient Preparation of Catechin Thio Conjugates by One Step Extraction/Depolymerization of Pine (Pinus pinaster) Bark Procyanidins
AU Selga, Ariadna; Torres, Josep Lluis
CS Institute for Chemical and Environmental Research (IIQAB-CSIC), Barcelona, 08034, Spain
SO Journal of Agricultural and Food Chemistry (2005), 53(20), 7760-7765
CODEN: JAFCAU; ISSN: 0021-8561
PB American Chemical Society
DT Journal
LA English
AB The skin penetrating antioxidant cysteamine derivative of (-)-epicatechin as well as other thio conjugates were efficiently obtained with high yields from pine (Pinus pinaster) bark by simultaneous one pot extraction and depolymn. using water and cysteamine hydrochloride. The influence of the concentration of bark, acid, and cysteamine, as well as the reaction time on the total conversion, was studied. The total conversion into the epicatechin and catechin conjugates was as high as 47 g/kg pine bark with 1666 g cysteamine/kg bark and 28 g/kg with 166 g cysteamine/kg bark. A fast cleanup step by absorption/desorption on XAD-16 greatly facilitated further purification of the active major component. At a pilot scale,

4β-(2-aminoethylthio)epicatechin (1) (conversion 263 g, purity 35% by reversed phase high-performance liquid chromatog./weight) was obtained from 17 kg of pine bark after simultaneous extraction/depolymn. followed by cleanup with the polymeric resin in .apprx.10 h. The results show that pine (P. pinaster) bark is a suitable source of flavanols for the preparation of active thio derivs. Conditions are given for the fast and efficient preparation of the conjugates.

CC 63-4 (Pharmaceuticals)

ST catechin thioconjugate antioxidant procyanidin Pinus

IT Flavanols
RL: FMU (Formation, unclassified); PUR (Purification or recovery); FORM (Formation, nonpreparative); **PREP (Preparation)**
(cysteamine conjugates; efficient preparation of catechin thio conjugates by one step extraction/depolymn. of pine (Pinus pinaster) bark **procyanidins**)

IT Antioxidants
Depolymerization
Pinus pinaster
Radical scavengers
(efficient preparation of catechin thio conjugates by one step extraction/depolymn. of pine (Pinus pinaster) bark procyanidins)

IT Procyanidins
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(efficient preparation of **catechin** thio conjugates by one step extraction/depolymn. of pine (Pinus pinaster) bark procyanidins)

IT 374078-00-9P, 4β-(2-Aminoethylthio)epicatechin 374078-02-1P, 4β-(2-Aminoethylthio)catechin
RL: FMU (Formation, unclassified); PUR (Purification or recovery); FORM (Formation, nonpreparative); **PREP (Preparation)**
(efficient preparation of catechin thio conjugates by one step extraction/depolymn. of pine (Pinus pinaster) bark **procyanidins**)

IT 156-57-0, Cysteamine hydrochloride
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(efficient preparation of **catechin** thio conjugates by one step extraction/depolymn. of pine (Pinus pinaster) bark procyanidins)

RE.CNT 34 THERE ARE 34 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L20 ANSWER 5 OF 34 HCAPLUS COPYRIGHT 2006 ACS on STN

AN 2005:78211 HCAPLUS

DN 142:155725

TI Synthesis of **oligomeric** epicatechin and catechin-derived procyanidins as anticancer agents

IN Kozikowski, Allan P.; Tuckmantel, Werner; Romanczyk, Leo J.; Ma, Xingquan

PA USA

SO U.S. Pat. Appl. Publ., 17 pp., Cont.-in-part of U.S. Provisional Ser. No. 415,616.
CODEN: USXXCO

DT Patent

LA English

FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2005020512	A1	20050127	US 2004-481729	20040915
	WO 2004030440	A2	20040415	WO 2003-US31375	20031002
	WO 2004030440	A3	20040610		

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM,

PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN,
TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW
RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY,
KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES,
FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR,
BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

PRAI US 2002-415616P P 20021002
WO 2003-US31375 W 20031002
US 2003-658241 A2 20030909

OS CASREACT 142:155725

AB Various processes are disclosed for preparing procyanidin **oligomers** having (4,8)-interflavan linkages. In an improved process, a tetra-O-protected-epicatechin or catechin monomer or **oligomer** is coupled with a protected, C-4 alkoxy-activated-epicatechin or -catechin monomer in the presence of an acidic clay instead of a Lewis acid. In a second process, a 5,7,3',4'-tetra-O-protected or preferably penta-O-protected-epicatechin or -catechin monomer or **oligomer** is reacted with a tetra-O-protected or preferably penta-O-protected-epicatechin or -catechin monomer having a thio activating group at the C-4 position; the coupling is carried out in the presence of silver tetrafluoroborate. In third process, two mols. of a penta-O-protected-epicatechin or -catechin monomer activated with a 2-(benzothiazolyl)thio group at the C-4 position are self-condensed in the presence of silver tetrafluoroborate. An improved two-step process for preparing a C-4 alkoxy activated tetra-O-benzyl-protected, 8-bromo-blocked-epicatechin or -catechin monomer is also provided. The use of naturally-derived and synthetically-prepared procyanidin (4β,8)4-pentamers to treat cancer is also disclosed.

IC ICM A61K031-7048
ICS A61K031-353

INCL 514027000; 514456000; 536008000; 549403000

CC 26-4 (Biomolecules and Their Synthetic Analogs)
Section cross-reference(s): 1, 63

ST epicatechin **oligomer** procyanidin prepn anticancer; catechin **oligomer** procyanidin prepn anticancer; coupling acidic clay promoted coupling epicatechin **oligomer** prepn

IT Condensation reaction
(autocondensation; synthesis of **oligomeric** epicatechin and catechin-derived procyanidins via self-condensation)

IT Clays, uses
RL: CAT (Catalyst use); USES (Uses)
(bentonitic; synthesis of **oligomeric** epicatechin and catechin-derived procyanidins via acidic clay promoted coupling)

IT Antitumor agents
Human
Mammary gland, neoplasm
Neoplasm
(synthesis of **oligomeric** epicatechin and catechin-derived procyanidins as anticancer agents)

IT Flavanols
Procyanidins
RL: PAC (Pharmacological activity); SPN (Synthetic preparation); THU (Therapeutic use); BIOL (Biological study); **PREP (Preparation)**; USES (Uses)
(synthesis of **oligomeric** epicatechin and catechin-derived **procyanidins** as anticancer agents)

IT Coupling reaction
(synthesis of **oligomeric** epicatechin and catechin-derived procyanidins via acidic clay promoted coupling)

IT 1318-93-0, K-10 (Mineral), uses

RL: CAT (Catalyst use); USES (Uses)
(synthesis of **oligomeric** epicatechin and catechin-derived procyanidins as anticancer agents)

IT 37064-30-5P 79907-44-1P 86631-38-1P 86631-39-2P 88847-05-6P
134054-57-2P 178458-88-3P 197975-71-6P 220089-13-4P 220089-14-5P
680593-76-4P 680593-81-1P
RL: PAC (Pharmacological activity); SPN (Synthetic preparation); THU (Therapeutic use); BIOL (Biological study); **PREP (Preparation)**; USES (Uses)
(synthesis of **oligomeric** epicatechin and catechin-derived **procyanidins** as anticancer agents)

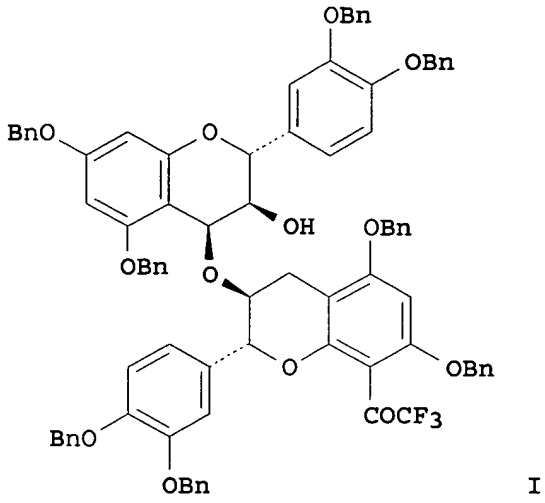
IT 87292-49-7 679797-90-1 679797-98-9 679798-00-6
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(synthesis of **oligomeric epicatechin** and **catechin**-derived procyanidins as anticancer agents)

IT 149-30-4P, 2-Mercaptobenzothiazole 223387-28-8P 223387-30-2P
256236-25-6P 477565-85-8P 477565-87-0P 477565-89-2P 477565-90-5P
477565-94-9P 477565-95-0P 477565-96-1P 477566-06-6P 477566-11-3P
479617-14-6P 479617-46-4P 479617-48-6P 479617-51-1P 479617-55-5P
479617-59-9P 479617-64-6P 479617-66-8P
RL: **RCT (Reactant)**; SPN (Synthetic preparation); **PREP (Preparation)**; RACT (Reactant or reagent)
(synthesis of **oligomeric epicatechin** and **catechin**-derived **procyanidins** as anticancer agents)

IT 75-24-1, Trimethylaluminum
RL: RGT (Reagent); RACT (Reactant or reagent)
(synthesis of **oligomeric** epicatechin and catechin-derived procyanidins as anticancer agents)

IT 477565-91-6P 477565-93-8P 477566-00-0P 477566-01-1P 477566-02-2P
477566-03-3P 477566-04-4P 477566-07-7P 477566-08-8P 477566-09-9P
477566-10-2P 479617-57-7P 479617-69-1P
RL: SPN (Synthetic preparation); **PREP (Preparation)**
(synthesis of **oligomeric** epicatechin and catechin-derived **procyanidins** as anticancer agents)

L20 ANSWER 6 OF 34 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2005:74658 HCAPLUS
DN 142:316585
TI Synthesis of modified proanthocyanidins: introduction of acyl substituents at C-8 of catechin. Selective synthesis of a C-4→O→C-3 ether-linked procyanidin-like dimer
AU Beauhaire, Josiane; Es-Safi, Nour-Eddine; Boyer, Francois-Didier; Kerhoas, Lucien; Le Guerneve, Christine; Ducrot, Paul-Henri
CS Unite de Phytopharmacie et Mediateurs Chimiques, Inra, Versailles, 78026, Fr.
SO Bioorganic & Medicinal Chemistry Letters (2005), 15(3), 559-562
CODEN: BMCLE8; ISSN: 0960-894X
PB Elsevier B.V.
DT Journal
LA English
OS CASREACT 142:316585
GI



I

AB The regioselective introduction of substituents at C-8 of (+)-catechin is described, leading to the synthesis of several catechin derivs. with various substitution patterns to be used for the further synthesis of modified proanthocyanidins. Thereafter, a new 3-O-4 ether-linked procyanidin-like derivative, e.g., I, was synthesized. Its formation was selectively achieved through TiCl4-catalyzed condensation of 4-(2-hydroxyethoxy)tetra-O-benzyl catechin with the 8-trifluoroacetyl adduct of tetra-O-benzyl catechin.

CC 26-4 (Biomolecules and Their Synthetic Analogs)

ST catechin regioselective acyl substitution procyanidin dimer prepn

IT Proanthocyanidins
RL: SPN (Synthetic preparation); **PREP (Preparation)**
(ether-linked **procyanidin**-like dimer; regioselective introduction of acyl substituents at C-8 of catechin and preparation of a C-4→O→C-3 ether-linked **procyanidin**-like dimer)

IT Flavanols
RL: **RCT (Reactant)**; SPN (Synthetic preparation); **PREP (Preparation)**; RACT (Reactant or reagent)
(regioselective introduction of acyl substituents at C-8 of **catechin** and preparation of a C-4→O→C-3 ether-linked **procyanidin**-like dimer)

IT Substitution reaction
(regioselective; regioselective introduction of acyl substituents at C-8 of catechin and preparation of a C-4→O→C-3 ether-linked procyanidin-like dimer)

IT Condensation reaction catalysts
(titanium tetrachloride; regioselective introduction of acyl substituents at C-8 of catechin and preparation of a C-4→O→C-3 ether-linked procyanidin-like dimer)

IT 7550-45-0, Titanium tetrachloride, uses
RL: CAT (Catalyst use); USES (Uses)
(regioselective introduction of acyl substituents at C-8 of catechin and preparation of a C-4→O→C-3 ether-linked procyanidin-like dimer)

IT 68-12-2, Dimethylformamide, reactions 100-39-0, Benzyl bromide 107-21-1, Ethylene glycol, reactions **154-23-4** 407-25-0, Trifluoroacetic anhydride 59434-20-7
RL: **RCT (Reactant)**; RACT (Reactant or reagent)

(regioselective introduction of acyl substituents at C-8 of **catechin** and preparation of a C-4→O→C-3 ether-linked procyanidin-like dimer)

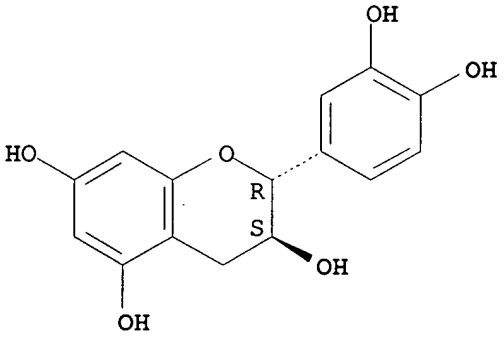
IT 20728-73-8P 85443-49-8P 89385-18-2P 89385-96-6P 223387-51-7P
RL: **RCT (Reactant)**; SPN (Synthetic preparation); **PREP (Preparation)**; RACT (Reactant or reagent)
(regioselective introduction of acyl substituents at C-8 of **catechin** and preparation of a C-4→O→C-3 ether-linked **procyanidin**-like dimer)

IT 89386-27-6P 848047-61-0P 848074-15-7P 848074-16-8P 848074-17-9P
RL: SPN (Synthetic preparation); **PREP (Preparation)**
(regioselective introduction of acyl substituents at C-8 of catechin and preparation of a C-4→O→C-3 ether-linked **procyanidin**-like dimer)

IT **154-23-4**
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(regioselective introduction of acyl substituents at C-8 of **catechin** and preparation of a C-4→O→C-3 ether-linked procyanidin-like dimer)

RN 154-23-4 HCAPLUS
CN 2H-1-Benzopyran-3,5,7-triol, 2-(3,4-dihydroxyphenyl)-3,4-dihydro-, (2R,3S)- (9CI) (CA INDEX NAME)

Absolute stereochemistry. Rotation (+).



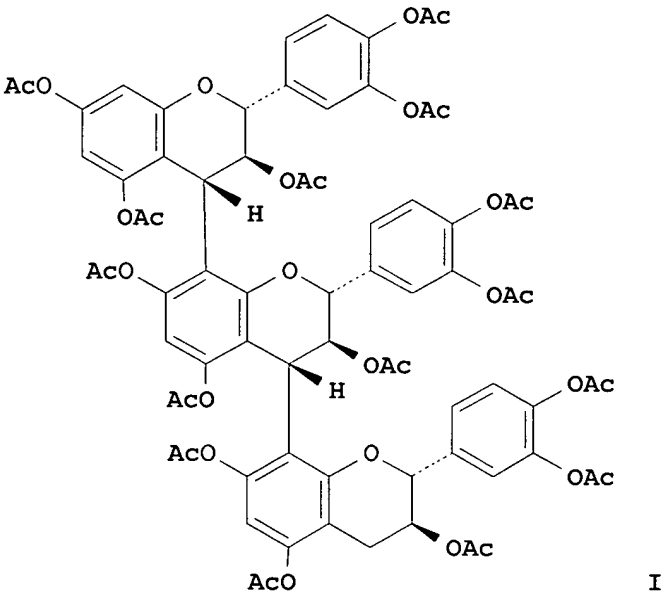
RE.CNT 21 THERE ARE 21 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L20 ANSWER 7 OF 34 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2004:763202 HCAPLUS
DN 141:410718
TI Stereoselection of 3,4-cis and 3,4-trans catechin and catechin condensation under intramolecular coupling method
AU Saito, Akiko; Tanaka, Akira; Ubukata, Makoto; Nakajima, Noriyuki
CS Biotechnology Center, Kosugi, 939-0398, Japan
SO Synlett (2004), (11), 2040-2042
CODEN: SYNLES; ISSN: 0936-5214
PB Georg Thieme Verlag
DT Journal
LA English
OS CASREACT 141:410718
AB A high level of stereoselection between 3,4-cis and 3,4-trans catechin-catechin condensation under intramol. coupling method has been realized by changing the diester linker between the nucleophile and the electrophile. The azelaic acid linker gave exclusively 3,4-trans catechin-catechin dimer, whereas glutaric acid linker gave 3,4-cis

catechin-catechin dimer as the sole product.
CC 26-4 (Biomolecules and Their Synthetic Analogs)
ST proanthocyanidin prepn; procyanidin B3 catechin dimer prepn; intramol coupling stereoselectivity catechin condensation diester linker
IT Esters, preparation
RL: **RCT (Reactant)**; SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)
(diesters; stereoselection between 3,4-cis and 3,4-trans **catechin-catechin** condensation under intramol. coupling method by changing the diester linker between the nucleophile and the electrophile)
IT Coupling reaction
(intramol.; stereoselective synthesis of procyanidin B3 and other catechin dimer derivs. via TMSOTf-catalyzed intramol. condensation)
IT Asymmetric synthesis and induction
(of procyanidin B3 and other catechin dimer derivs. by changing the diester linker between the nucleophile and the electrophile)
IT **Procyanidins**
RL: SPN (Synthetic preparation); **PREP (Preparation)**
(preparation of **procyanidin** B3 and other catechin dimer derivs. by changing the diester linker between the nucleophile and the electrophile)
IT Condensation reaction catalysts
(stereoselective synthesis of procyanidin B3 and other catechin dimer derivs. via TMSOTf-catalyzed intramol. condensation)
IT 71627-63-9 478796-20-2 596829-24-2 664351-39-7 666233-43-8 791074-07-2 791074-08-3 791074-09-4 791074-10-7 791074-11-8 791074-23-2
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(stereoselection between 3,4-cis and 3,4-trans **catechin-catechin** condensation under intramol. coupling method by changing the diester linker between the nucleophile and the electrophile)
IT 596829-25-3P 596829-26-4P 596829-27-5P 596829-29-7P 791074-12-9P 791074-13-0P 791074-14-1P 791074-15-2P 791074-16-3P 791074-17-4P 791074-18-5P 791074-19-6P 791074-20-9P 791074-21-0P
RL: **RCT (Reactant)**; SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)
(stereoselection between 3,4-cis and 3,4-trans **catechin-catechin** condensation under intramol. coupling method by changing the diester linker between the nucleophile and the electrophile)
IT 23567-23-9P 51196-37-3P 596829-40-2P 596829-41-3P 791074-22-1P
RL: SPN (Synthetic preparation); PREP (Preparation)
(stereoselection between 3,4-cis and 3,4-trans catechin-catechin condensation under intramol. coupling method by changing the diester linker between the nucleophile and the electrophile)
IT 27607-77-8, Trimethylsilyl triflate
RL: CAT (Catalyst use); USES (Uses)
(stereoselective synthesis of procyanidin B3 and other catechin dimer derivs. via TMSOTf-catalyzed intramol. condensation)
RE.CNT 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L20 ANSWER 8 OF 34 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2004:713707 HCAPLUS
DN 141:349945
TI **Oligomeric** catechins: An enabling synthetic strategy by orthogonal activation and C(8) protection
AU Ohmori, Ken; Ushimaru, Naoko; Suzuki, Keisuke

CS Department of Chemistry, Tokyo Institute of Technology, Tokyo, 152-8551, Japan
SO Proceedings of the National Academy of Sciences of the United States of America (2004), 101(33), 12002-12007
CODEN: PNASA6; ISSN: 0027-8424
PB National Academy of Sciences
DT Journal
LA English
OS CASREACT 141:349945
GI



I

AB Controlled formation of **oligomeric** catechins, e.g., I, has become possible by an orthogonal synthetic strategy. Bromo-capping of the C(8) position of the flavan skeleton enabled the equimolar coupling of electrophilic and nucleophilic catechin derivs., enabling an efficient synthetic strategy to complex catechin **oligomers.**
CC 26-4 (Biomolecules and Their Synthetic Analogs)
ST catechin **oligomeric** prepn orthogonal activation bromo capping; stereoselective substitution flavan skeleton
IT Stereoselective synthesis
(of **oligomeric** catechins via orthogonal activation and C(8) protection)
IT Flavanols
RL: **RCT (Reactant)**; SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)
(**oligomeric**; preparation of **oligomeric catechins** via orthogonal activation and C(8) protection)
IT **Procyanidins**
RL: **RCT (Reactant)**; SPN (Synthetic preparation); **PREP (Preparation)**; RACT (Reactant or reagent)
(preparation of **oligomeric catechins** via orthogonal activation and C(8) protection)
IT Coupling reaction

(stereoselective; between catechin monomers in preparation of **oligomeric** catechins via orthogonal activation and C(8) protection)

IT 89385-59-1P 777063-21-5P
RL: BYP (Byproduct); PREP (Preparation)
(preparation of **oligomeric** catechins via orthogonal activation and C(8) protection)

IT 12135-22-7, Palladium dihydroxide
RL: CAT (Catalyst use); USES (Uses)
(preparation of **oligomeric** catechins via orthogonal activation and C(8) protection)

IT 777063-23-7P
RL: PNU (Preparation, unclassified); PREP (Preparation)
(preparation of **oligomeric** catechins via orthogonal activation and C(8) protection)

IT 108-24-7, Acetic anhydride 108-98-5, Thiophenol, reactions 85443-49-8 478241-14-4 478241-31-5
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(preparation of **oligomeric catechins** via orthogonal activation and C(8) protection)

IT 777063-24-8P 777063-25-9P 777063-27-1P 777063-28-2P 777063-29-3P
RL: **RCT (Reactant)**; SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)
(preparation of **oligomeric catechins** via orthogonal activation and C(8) protection)

IT 109-63-7, Boron trifluoride etherate 516-12-1, N-Iodosuccinimide 14104-20-2
RL: RGT (Reagent); RACT (Reactant or reagent)
(preparation of **oligomeric** catechins via orthogonal activation and C(8) protection)

IT 16198-01-9P 21179-22-6P 78392-24-2P 777063-19-1P 777063-20-4P 777063-22-6P 777063-26-0P
RL: SPN (Synthetic preparation); PREP (Preparation)
(preparation of **oligomeric** catechins via orthogonal activation and C(8) protection)

RE.CNT 27 THERE ARE 27 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L20 ANSWER 9 OF 34 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2004:710471 HCAPLUS
DN 141:325164
TI Systematic synthesis of four epicatechin series procyanidin trimers and their inhibitory activity on the Maillard reaction and antioxidant activity
AU Saito, Akiko; Doi, Yuki; Tanaka, Akira; Matsuura, Nobuyasu; Ubukata, Makoto; Nakajima, Noriyuki
CS Biotechnology Center, Kosugi, Toyama, 939-0398, Japan
SO Bioorganic & Medicinal Chemistry (2004), 12(18), 4783-4790
CODEN: BMECEP; ISSN: 0968-0896
PB Elsevier Ltd.
DT Journal
LA English
OS CASREACT 141:325164
AB A systematic synthesis of four natural epicatechin series procyanidin trimers {[4,8:4'',8'']-2,3-cis-3,4-trans: 2'',3''-cis-3'',4''-trans: 2'''',3''''-trans-(-)-epi-catechin-(-)-epicatechin-(+)-catechin, [4,8:4'',8'']-2,3-cis-3,4-trans: 2'',3''-cis-3'',4''-trans: 2'''',3''''-cis-tri-(-)-epicatechin: procyanidin C1, [4,8:4'',8'']-2,3-cis-3,4-trans: 2'',3''-trans-3'',4''-trans: 2'''',3''''-trans-(-)-epicatechin-(+)-catechin-(+)-catechin: procyanidin C4, and [4,8:4'',8'']-2,3-cis-3,4-

trans: 2'',3''-trans-3'',4''-trans: 2'''',3''''-cis-(-)-epicatechin-(+)-catechin-(-)-epicatechin} is described. Condensation of (2R,3R,4S)-5,7,3',4'-tetra-O-benzyl-4-(2''-ethoxyethyloxy)flavan derived from (-)-epicatechin as an electrophile with the dimeric nucleophiles in the presence of TMSOTf followed by deprotection yielded trimers. Inhibitory activities on the Maillard reaction and antioxidant activity on lipid peroxide of the synthesized **oligomers** were also investigated.

CC 1-3 (Pharmacology)
Section cross-reference(s): 26

ST epicatechin procyanidin trimer antioxidant Maillard reaction

IT Structure-activity relationship
(antioxidant; systematic synthesis of four epicatechin series procyanidin trimers and their inhibitory activity on Maillard reaction and antioxidant activity)

IT Antioxidants
Lipid peroxidation
Maillard reaction
Oxidative stress, biological
(systematic synthesis of four epicatechin series procyanidin trimers and their inhibitory activity on Maillard reaction and antioxidant activity)

IT Lipid peroxidation
RL: BSU (Biological study, unclassified); BIOL (Biological study)
(systematic synthesis of four epicatechin series procyanidin trimers and their inhibitory activity on Maillard reaction and antioxidant activity)

IT 37064-30-5P, **Procyanidin** C1 79813-67-5P 87727-69-3P, **Procyanidin** C4 99297-48-0P
RL: PAC (Pharmacological activity); PRP (Properties); **RCT (Reactant)**; SPN (Synthetic preparation); THU (Therapeutic use); BIOL (Biological study); **PREP (Preparation)**; RACT (Reactant or reagent); USES (Uses)
(systematic synthesis of four **epicatechin** series **procyanidin** trimers and their inhibitory activity on Maillard reaction and antioxidant activity)

IT 82837-95-4P 82837-96-5P, **Procyanidin** C1 peracetate 173832-19-4P, **Procyanidin** C4 peracetate 723242-38-4P
RL: PAC (Pharmacological activity); PRP (Properties); SPN (Synthetic preparation); THU (Therapeutic use); BIOL (Biological study); **PREP (Preparation)**; USES (Uses)
(systematic synthesis of four epicatechin series **procyanidin** trimers and their inhibitory activity on Maillard reaction and antioxidant activity)

IT 154-23-4, (+)-Catechin 490-46-0, (-)-Epicatechin 20315-25-7, Procyanidin B1 23567-23-9, Procyanidin B3 29106-49-8, Procyanidin B2 29106-51-2, Procyanidin B4
RL: PAC (Pharmacological activity); PRP (Properties); THU (Therapeutic use); BIOL (Biological study); USES (Uses)
(systematic synthesis of four epicatechin series procyanidin trimers and their inhibitory activity on Maillard reaction and antioxidant activity)

IT 223387-30-2P 722457-37-6P 722457-42-3P 722457-44-5P
RL: PRP (Properties); **RCT (Reactant)**; SPN (Synthetic preparation); **PREP (Preparation)**; RACT (Reactant or reagent)
(systematic synthesis of four **epicatechin** series **procyanidin** trimers and their inhibitory activity on Maillard reaction and antioxidant activity)

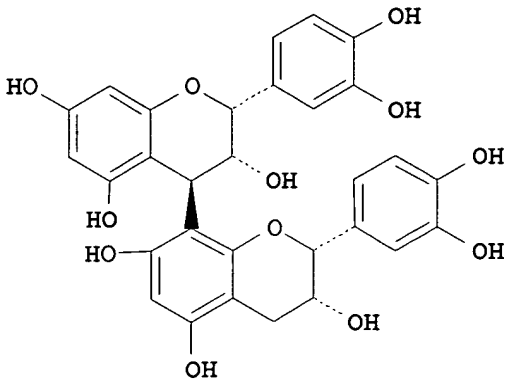
IT 137550-06-2 195145-79-0 223387-28-8 664351-39-7, (2R,3R,4S)-5,7,3',4'-Tetra-O-benzyl-4-(2''-ethoxyethyloxy)flavan

664351-43-3
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(systematic synthesis of four **epicatechin** series procyanidin trimers and their inhibitory activity on Maillard reaction and antioxidant activity)
RE.CNT 36 THERE ARE 36 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L20 ANSWER 10 OF 34 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2004:333711 HCAPLUS
DN 140:339116
TI Isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases
IN Castillo, Gerardo M.; Nguyen, Beth P.; Choi, Paula Y.; Larsen, Lesley; Lorimer, Stephen D.; Snow, Alan D.
PA Proteotech, Inc., USA
SO PCT Int. Appl., 108 pp.
CODEN: PIXXD2
DT Patent
LA English
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2004033448	A2	20040422	WO 2003-US32072	20031010
	WO 2004033448	A3	20040603		
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW				
	RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
	CA 2499549	AA	20040422	CA 2003-2499549	20031010
	AU 2003279213	A1	20040504	AU 2003-279213	20031010
	US 2004260076	A1	20041223	US 2003-684178	20031010
	EP 1554270	A2	20050720	EP 2003-770706	20031010
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK				
	JP 2006507357	T2	20060302	JP 2005-501147	20031010
PRAI	US 2002-418093P	P	20021011		
	US 2002-423089P	P	20021101		
	WO 2003-US32072	W	20031010		

OS CASREACT 140:339116
GI



I

AB Methods for the synthesis, isolation, and purification of procyanidin B2 (I) are disclosed. The synthetic methods utilize epicatechin as a starting material and produce procyanidin B2 in high yields. The isolation methods extract procyanidin B2 from a sample of bark powder from plant matter of the genus Uncaria. The isolated and/or synthesized procyanidin B2 is used to treat amyloid disease, such as Alzheimer's disease and Parkinson's disease. Pharmaceutical compns. containing the synthesized and/or isolated procyanidin B2 are also disclosed.

IC ICM C07D407-04
ICS A61P025-16; A61P025-28

CC 26-4 (Biomolecules and Their Synthetic Analogs)
Section cross-reference(s): 1, 11, 63

ST procyanidin B2 prepn treatment amyloid alpha synuclein disease; isolation procyanidin B2 Uncaria

IT Brain, disease
Prion diseases
(Creutzfeldt-Jakob; isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)

IT Inflammation
(Crohn's disease; isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)

IT Intestine, disease
(Crohn's; isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)

IT Brain, disease
Prion diseases
(Gerstmann-Straussler syndrome; isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)

IT Alzheimer's disease
(Lewy-body variant; isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)

IT Drug delivery systems
(aerosols; isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)

IT Brain, disease
(amyloidosis, hereditary cerebral hemorrhage type, Dutch type; isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)

IT Heart, disease
(amyloidosis, senile; isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)

IT Endocrine system, neoplasm
Multiple myeloma
Neoplasm
Prion diseases
(amyloidosis; isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)
IT Drug delivery systems
(capsules; isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)
IT Amyloidosis
(cardiac, senile; isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)
IT Blood vessel, disease
(cerebral β-amyloid; isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)
IT Fatigue, biological
(chronic fatigue syndrome; isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)
IT Inflammation
(chronic, amyloidosis; isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)
IT Mental and behavioral disorders
(dementia, pugilistica; isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)
IT Mental and behavioral disorders
(diffuse Lewy body disease; isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)
IT Drug delivery systems
(elixirs; isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)
IT Amyloidosis
(familial Mediterranean fever; isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)
IT Fever and Hyperthermia
(familial Mediterranean; isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)
IT Amyloidosis
Nerve, disease
(familial amyloidotic polyneuropathy; isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)
IT Amyloidosis
(hereditary, cerebral hemorrhage type, Dutch type; isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)
IT Infection
Skin, disease
(herpes; isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)
IT Respiratory system, disease
(infection; isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)
IT AIDS (disease)
Allergy
Alzheimer's disease

Anti-Alzheimer's agents
Arthritis
Dimerization
Down's syndrome
Esterification
Gout
Human
Human herpesvirus 4
Lupus erythematosus
Pain
Parkinson's disease
Protective groups
Rheumatic diseases
Skin, neoplasm
Uncaria tomentosa
(isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)

IT Transthyretin
RL: BSU (Biological study, unclassified); BIOL (Biological study)
(isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)

IT **Procyanidins**
RL: IMF (Industrial manufacture); PAC (Pharmacological activity); PUR (Purification or recovery); SPN (Synthetic preparation); THU (Therapeutic use); BIOL (Biological study); **PREP (Preparation)**; USES (Uses)
(isolation, purification and synthesis of **procyanidin** B2 for the treatment of amyloid and alpha-synuclein diseases)

IT Brain, disease
Prion diseases
(kuru; isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)

IT Nervous system, disease
(multiple system atrophy; isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)

IT Diabetes mellitus
(non-insulin-dependent, amyloidosis; isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)

IT Infection
(opportunistic; isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)

IT Nerve, disease
(peripheral nerve injury, amyloidosis; isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)

IT Injury
(peripheral nerve, amyloidosis; isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)

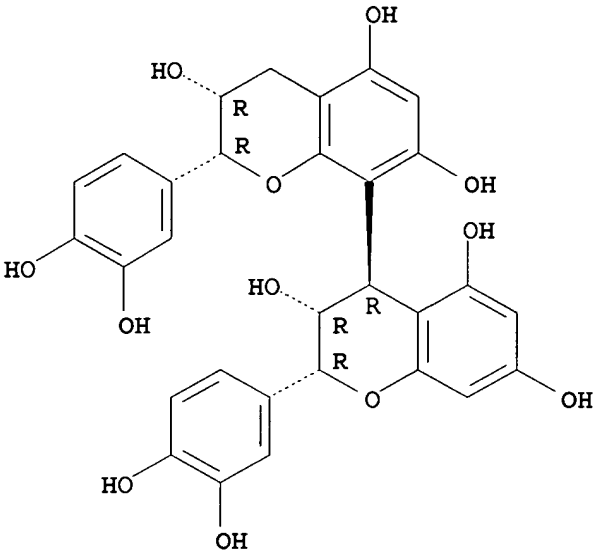
IT Drug delivery systems
(powders; isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)

IT Brain, disease
Prion diseases
(scrapie; isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)

IT Drug delivery systems
(semisolid; isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)

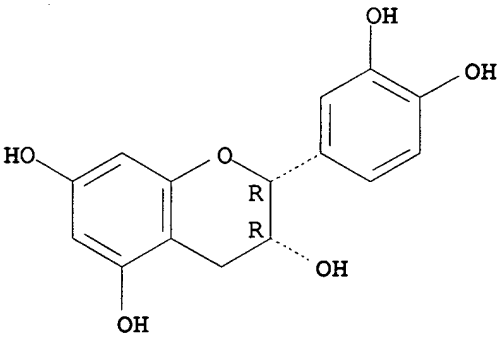
IT Drug delivery systems
(solns.; isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)
IT Intestine, disease
(stomach, bowel disorders; isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)
IT Drug delivery systems
(suspensions; isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)
IT Drug delivery systems
(sustained-release; isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)
IT Drug delivery systems
(tablets; isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)
IT Infection
(viral; isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)
IT Amyloid
RL: ADV (Adverse effect, including toxicity); BSU (Biological study, unclassified); BIOL (Biological study)
(β-, amyloidosis; isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)
IT 56645-65-9, Procalcitonin
RL: BSU (Biological study, unclassified); BIOL (Biological study)
(isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)
IT **29106-49-8P**
RL: IMF (Industrial manufacture); PAC (Pharmacological activity); PUR (Purification or recovery); SPN (Synthetic preparation); THU (Therapeutic use); BIOL (Biological study); **PREP (Preparation)**; USES (Uses)
(isolation, purification and synthesis of **procyanidin** B2 for the treatment of amyloid and alpha-synuclein diseases)
IT 20194-41-6P 87292-49-7P 223387-26-6P 223387-28-8P
RL: IMF (Industrial manufacture); RCT (Reactant); SPN (Synthetic preparation); **PREP (Preparation)**; RACT (Reactant or reagent)
(isolation, purification and synthesis of **procyanidin** B2 for the treatment of amyloid and alpha-synuclein diseases)
IT 100-44-7, Benzyl chloride, reactions 107-21-1, Ethylene glycol, reactions 108-24-7, Acetic anhydride **490-46-0**
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)
IT 7647-01-0, Hydrochloric acid, reactions
RL: RGT (Reagent); RACT (Reactant or reagent)
(isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)
IT **29106-49-8P**
RL: IMF (Industrial manufacture); PAC (Pharmacological activity); PUR (Purification or recovery); SPN (Synthetic preparation); THU (Therapeutic use); BIOL (Biological study); **PREP (Preparation)**; USES (Uses)
(isolation, purification and synthesis of **procyanidin** B2 for the treatment of amyloid and alpha-synuclein diseases)
RN 29106-49-8 HCAPLUS
CN [4,8'-Bi-2H-1-benzopyran]-3,3',5,5',7,7'-hexol, 2,2'-bis(3,4-dihydroxyphenyl)-3,3',4,4'-tetrahydro-, (2R,2'R,3R,3'R,4R)- (9CI) (CA INDEX NAME)

Absolute stereochemistry.



IT **490-46-0**
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(isolation, purification and synthesis of procyanidin B2 for the treatment of amyloid and alpha-synuclein diseases)
RN 490-46-0 HCAPLUS
CN 2H-1-Benzopyran-3,5,7-triol, 2-(3,4-dihydroxyphenyl)-3,4-dihydro-, (2R,3R)- (9CI) (CA INDEX NAME)

Absolute stereochemistry. Rotation (-).



L20 ANSWER 11 OF 34 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2004:306371 HCAPLUS
DN 140:339115
TI Process for preparing **oligomeric** epicatechin and catechin-derived procyanidins for use as anticancer agents
IN Kozikowski, Alan P.; Tuckmantel, Werner; Romanczyk, Leo J., Jr.; Ma, Xiangquan
PA Mars, Incorporated, USA
SO PCT Int. Appl., 42 pp.
CODEN: PIXXD2
DT Patent
LA English

FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2004030440	A2	20040415	WO 2003-US31375	20031002
	WO 2004030440	A3	20040610		
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW				
	RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
	US 2004116718	A1	20040617	US 2003-658241	20030909
	CA 2500056	AA	20040415	CA 2003-2500056	20031002
	AU 2003275413	A1	20040423	AU 2003-275413	20031002
	EP 1560576	A2	20050810	EP 2003-759691	20031002
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK				
	JP 2006510730	T2	20060330	JP 2005-500368	20031002
	US 2005020512	A1	20050127	US 2004-481729	20040915
PRAI	US 2002-415616P	P	20021002		
	US 2003-658241	A2	20030909		
	WO 2003-US31375	W	20031002		

OS CASREACT 140:339115

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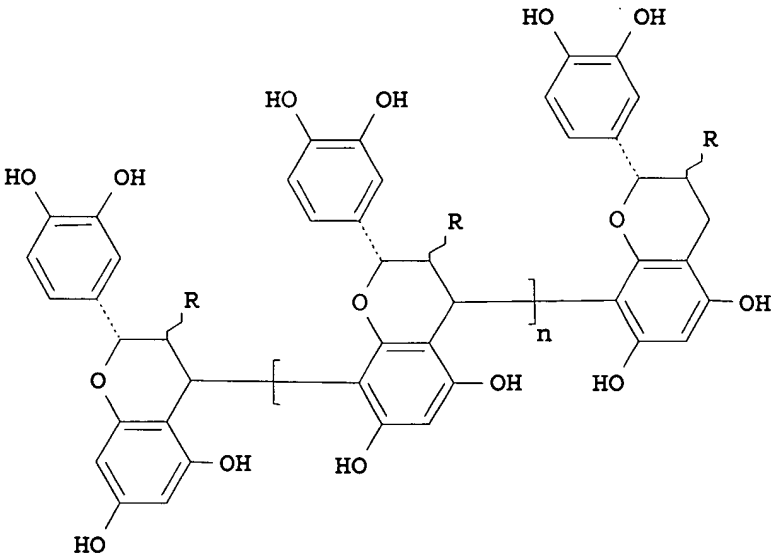


I

AB Various processes are disclosed for preparing procyanidin **oligomers**, such as I [R = α-OH, β-OH; n = 2-9], having (4,8)interflavan linkages. In an improved process, a tetra-O-protected-epicatechin or -catechin monomer or **oligomer** is coupled with a protected, C-4 alkoxy-activated-epicatechin or -catechin monomer in the presence of an

acidic clay instead of a Lewis acid. In a second process, a 5,7,3',4'-tetra-O-protected or preferably penta-O-protected-epicatechin or -catechin monomer or **oligomer** is reacted with a tetra-O-protected or preferably penta-O-protected-epicatechin or -catechin monomer having a thio activating group at the C-4 position; the coupling is carried out in the presence of silver tetrafluoroborate. In third process, two mols. of a penta-O-protected-epicatechin or -catechin monomer activated with a 2(benzothiazolyl)thio group at the C-4 position are self-condensed in the presence of silver tetrafluoroborate. An improved two-step process for preparing a C-4 alkoxy activated tetra-O-benzyl-protected, 8-bromo-blocked-epicatechin or -catechin monomer is also provided. The use of naturally-derived and synthetically-prepared procyanidin (4β,8)4-pentamers, such as I (R = α-OH, n = 3), to treat cancer is also disclosed.

IC ICM C07D301-00

CC 26-4 (Biomolecules and Their Synthetic Analogs)
Section cross-reference(s): 1, 63

ST procyanidin **oligomer** prepn anticancer; breast cancer inhibitor procyanidin pentamer prepn; coupling reaction flavanol procyanidin **oligomer** prepn clay

IT Clays, uses
RL: CAT (Catalyst use); USES (Uses)
(acidic; for condensation between protected-epicatechin or catechin monomer and protected-4-alkoxy-epicatechin or catechin monomer in preparation of **oligomeric** epicatechin and catechin-derived procyanidins for use as anticancer agents)

IT Clays, uses
RL: CAT (Catalyst use); USES (Uses)
(bentonitic, K-10; in preparation of **oligomeric** epicatechin and catechin-derived procyanidins for use as anticancer agents)

IT Coupling reaction
(between protected-epicatechin or catechin monomer and protected-4-alkoxy-epicatechin or catechin monomer in preparation of **oligomeric** epicatechin and catechin-derived procyanidins for use as anticancer agents)

IT Reversed phase HPLC
(for isolating **oligomeric** epicatechin and catechin-derived procyanidins)

IT Liquid chromatography
(for separating the protected monomer(s) and protected dimer or higher **oligomer** during preparation of **oligomeric** epicatechin and catechin-derived procyanidins for use as anticancer agents)

IT Clays, uses
RL: CAT (Catalyst use); USES (Uses)
(montmorillonitic; preparation of **oligomeric** epicatechin and catechin-derived procyanidins for use as anticancer agents)

IT Asymmetric synthesis and induction
Cytotoxicity
(of **oligomeric** epicatechin and catechin-derived procyanidins for use as anticancer agents)

IT Antitumor agents
Condensation reaction
Deacetylation
Debenzylation
Human
(preparation of **oligomeric** epicatechin and catechin-derived procyanidins for use as anticancer agents)

IT **Procyanidins**
RL: IMF (Industrial manufacture); PAC (Pharmacological activity); **RCT (Reactant)**; SPN (Synthetic preparation); THU (Therapeutic use); BIOL

(Biological study); **PREP (Preparation)**; RACT (Reactant or reagent); USES (Uses)
(preparation of **oligomeric epicatechin** and **catechin**-derived **procyanidins** for use as anticancer agents)

IT Thiols, reactions
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(salts, organoaluminum; preparation of **oligomeric epicatechin** and **catechin**-derived procyanidins for use as anticancer agents)

IT Salts, reactions
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(thiol, organoaluminum; preparation of **oligomeric epicatechin** and **catechin**-derived procyanidins for use as anticancer agents)

IT Mammary gland, neoplasm
(treatment; preparation of **oligomeric** epicatechin and catechin-derived procyanidins for use as anticancer agents)

IT 134054-57-2P
RL: PAC (Pharmacological activity); SPN (Synthetic preparation); THU (Therapeutic use); BIOL (Biological study); **PREP (Preparation)**; USES (Uses)
(Catechin-(4α,8)-catechin digallate; preparation of **oligomeric** epicatechin and catechin-derived **procyanidins** for use as anticancer agents)

IT 220089-14-5P
RL: PAC (Pharmacological activity); SPN (Synthetic preparation); THU (Therapeutic use); BIOL (Biological study); **PREP (Preparation)**; USES (Uses)
(Catechin-(4α,8)-epicatechin digallate; preparation of **oligomeric** epicatechin and catechin-derived **procyanidins** for use as anticancer agents)

IT 680593-76-4P
RL: PAC (Pharmacological activity); SPN (Synthetic preparation); THU (Therapeutic use); BIOL (Biological study); **PREP (Preparation)**; USES (Uses)
(Catechin-(4β,8)-catechin digallate; preparation of **oligomeric** epicatechin and catechin-derived **procyanidins** for use as anticancer agents)

IT 680593-81-1P
RL: PAC (Pharmacological activity); SPN (Synthetic preparation); THU (Therapeutic use); BIOL (Biological study); **PREP (Preparation)**; USES (Uses)
(Catechin-(4β,8)-epicatechin digallate; preparation of **oligomeric** epicatechin and catechin-derived **procyanidins** for use as anticancer agents)

IT 220089-13-4P
RL: PAC (Pharmacological activity); SPN (Synthetic preparation); THU (Therapeutic use); BIOL (Biological study); **PREP (Preparation)**; USES (Uses)
(Epicatechin-(4β,8)-catechin digallate; preparation of **oligomeric** epicatechin and catechin-derived **procyanidins** for use as anticancer agents)

IT 79907-44-1P
RL: PAC (Pharmacological activity); SPN (Synthetic preparation); THU (Therapeutic use); BIOL (Biological study); **PREP (Preparation)**; USES (Uses)
(Epicatechin-(4β,8)-epicatechin digallate; preparation of **oligomeric** epicatechin and catechin-derived **procyanidins** for use as anticancer agents)

IT 12135-22-7, Pearlman's catalyst
RL: CAT (Catalyst use); USES (Uses)
(for deprotection of benzyl groups in preparation of **oligomeric** epicatechin and catechin-derived procyanidins for use as anticancer agents)

IT 14104-20-2, Silver tetrafluoroborate
RL: CAT (Catalyst use); USES (Uses)
(preparation of **oligomeric** epicatechin and catechin-derived procyanidins for use as anticancer agents)

IT 20315-25-7P 23567-23-9P **29106-49-8P 29106-51-2P**
51196-37-3P 51196-38-4P 86631-39-2P 679797-93-4P 679797-94-5P
RL: IMF (Industrial manufacture); PAC (Pharmacological activity); SPN (Synthetic preparation); THU (Therapeutic use); BIOL (Biological study); **PREP (Preparation)**; USES (Uses)
(preparation of **oligomeric** epicatechin and catechin-derived **procyanidins** for use as anticancer agents)

IT 137624-12-5P 223387-28-8P 223387-30-2P 256236-25-6P 477565-85-8P
477565-87-0P 477565-90-5P 477565-94-9P 477565-95-0P 477565-96-1P
477566-06-6P 477566-10-2P 479617-14-6P 479617-46-4P 479617-48-6P
479617-51-1P 479617-55-5P 479617-59-9P 479617-64-6P 479617-66-8P
479617-69-1P 664351-43-3P
RL: IMF (Industrial manufacture); **RCT (Reactant)**; SPN (Synthetic preparation); **PREP (Preparation)**; RACT (Reactant or reagent)
(preparation of **oligomeric epicatechin** and **catechin**-derived **procyanidins** for use as anticancer agents)

IT 88847-05-6P 137550-06-2P 178458-88-3P 197975-71-6P 477565-91-6P
477565-93-8P 477566-00-0P 477566-03-3P 477566-04-4P 477566-07-7P
477566-08-8P 477566-09-9P 477566-11-3P 679797-92-3P 679797-95-6P
RL: IMF (Industrial manufacture); SPN (Synthetic preparation); **PREP (Preparation)**
(preparation of **oligomeric** epicatechin and catechin-derived **procyanidins** for use as anticancer agents)

IT 75-24-1, Trimethylaluminum 107-21-1, Ethylene glycol, reactions
108-24-7, Acetic anhydride 149-30-4, 2-Mercaptobenzothiazole 149-91-7, Gallic acid, reactions 20728-73-8 87292-49-7 301539-02-6
477565-89-2 679797-90-1 679797-96-7 679797-97-8 679797-98-9
679797-99-0 679798-00-6 680186-62-3
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(preparation of **oligomeric epicatechin** and **catechin**-derived procyanidins for use as anticancer agents)

IT 128-08-5, N-Bromosuccinimide
RL: RGT (Reagent); RACT (Reactant or reagent)
(preparation of **oligomeric** epicatechin and catechin-derived procyanidins for use as anticancer agents)

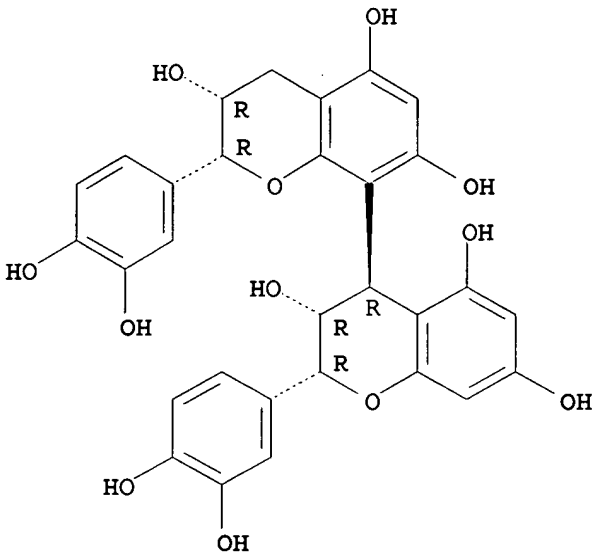
IT 75-09-2, Methylene chloride, uses
RL: NUU (Other use, unclassified); USES (Uses)
(solvent; preparation of **oligomeric** epicatechin and catechin-derived procyanidins for use as anticancer agents)

IT **29106-49-8P 29106-51-2P**
RL: IMF (Industrial manufacture); PAC (Pharmacological activity); SPN (Synthetic preparation); THU (Therapeutic use); BIOL (Biological study); **PREP (Preparation)**; USES (Uses)
(preparation of **oligomeric** epicatechin and catechin-derived **procyanidins** for use as anticancer agents)

RN 29106-49-8 HCAPLUS

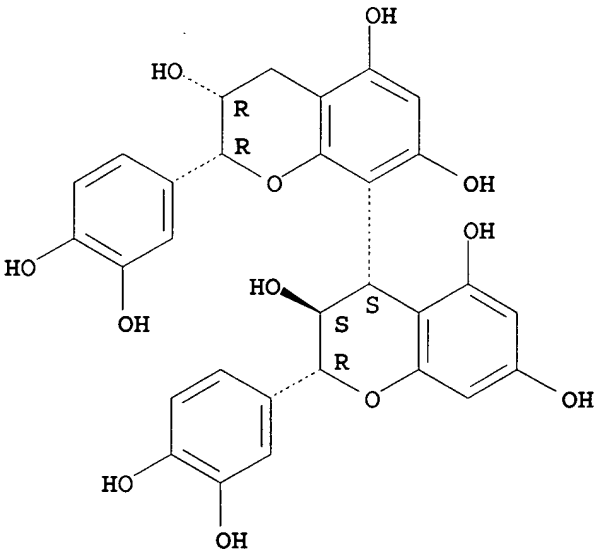
CN [4,8'-Bi-2H-1-benzopyran]-3,3',5,5',7,7'-hexol, 2,2'-bis(3,4-dihydroxyphenyl)-3,3',4,4'-tetrahydro-, (2R,2'R,3R,3'R,4R)- (9CI) (CA INDEX NAME)

Absolute stereochemistry.



RN 29106-51-2 HCAPLUS
CN [4,8'-Bi-2H-1-benzopyran]-3,3',5,5',7,7'-hexol, 2,2'-bis(3,4-dihydroxyphenyl)-3,3',4,4'-tetrahydro-, (2R,2'R,3S,3'R,4S)- (9CI) (CA INDEX NAME)

Absolute stereochemistry. Rotation (-).



L20 ANSWER 12 OF 34 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2004:14718 HCAPLUS
DN 140:217412
TI Synthetic studies of proanthocyanidins. Part 4. The synthesis of procyanidin B1 and B4: TMSOTf-catalyzed cyclization of catechin and epicatechin condensation

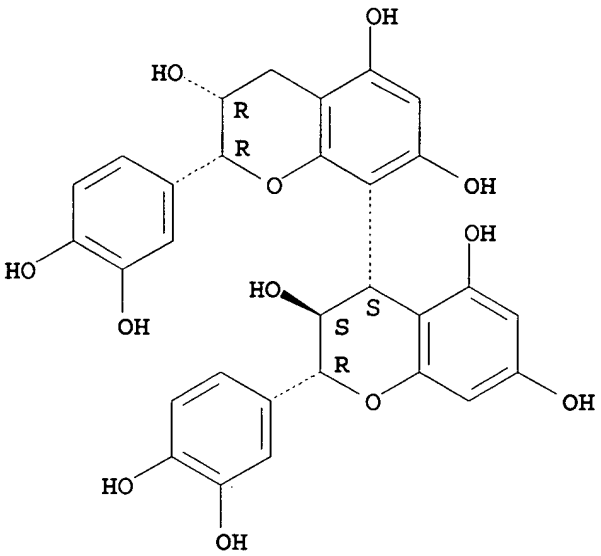
AU Saito, Akiko; Nakajima, Noriyuki; Tanaka, Akira; Ubukata, Makoto
CS Biotechnology Center, Toyama Prefecture, Prefectural University, Toyama, 939-0398, Japan
SO Heterocycles (2003), 61, 287-298
CODEN: HTCYAM; ISSN: 0385-5414
PB Japan Institute of Heterocyclic Chemistry
DT Journal
LA English
OS CASREACT 140:217412
AB Highly stereoselective synthesis of 3,4-trans series of (+)-catechin and (-)-epicatechin dimers under intramol. condensation is described. Intramol. condensation achieved an equimolar amount of coupling with 3,4-trans stereoselectivity and we succeeded in the synthesis of two 3,4-trans natural procyanidins, procyanidin-B1 and B4.
CC 26-4 (Biomolecules and Their Synthetic Analogs)
ST procyanidin B1 B4 prepn; catechin epicatechin condensation TMSOTf cyclization proanthocyanidin prepn
IT Proanthocyanidins
RL: SPN (Synthetic preparation); **PREP (Preparation)**
(dimers; TMSOTf-catalyzed cyclization of catechin and epicatechin in preparation of **procyanidin** B1 and B4)
IT Asymmetric synthesis and induction
(of procyanidin B1 and B4 via TMSOTf-catalyzed cyclization of catechin and epicatechin)
IT Cyclization catalysts
(stereoselective, Trimethylsilyl triflate; catalyzed cyclization of catechin and epicatechin in preparation of procyanidin B1 and B4)
IT Condensation reaction
(stereoselective, intramol.; TMSOTf-catalyzed cyclization of catechin and epicatechin in preparation of procyanidin B1 and B4)
IT 27607-77-8, Trimethylsilyl triflate
RL: CAT (Catalyst use); USES (Uses)
(TMSOTf-catalyzed cyclization of catechin and epicatechin in preparation of procyanidin B1 and B4)
IT 108-24-7, Acetic anhydride 108-55-4, Glutaric anhydride 478796-20-2 664351-39-7
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(TMSOTf-catalyzed cyclization of **catechin** and **epicatechin** in preparation of procyanidin B1 and B4)
IT 20315-25-7P, **Procyanidin** B1 20728-73-8P **29106-51-2P**, (-)-**Procyanidin** B4 87292-49-7P 195145-79-0P 596829-24-2P 596829-40-2P 596829-41-3P 596829-47-9P 664351-43-3P 666233-43-8P 666233-44-9P
RL: **RCT (Reactant)**; SPN (Synthetic preparation); **PREP (Preparation)**; RACT (Reactant or reagent)
(TMSOTf-catalyzed cyclization of **catechin** and **epicatechin** in preparation of **procyanidin** B1 and B4)
IT 21179-20-4P, (+)-Decaacetylprocyanidin B1 21179-23-7P, (-)-Decaacetylprocyanidin B4 666233-45-0P
RL: SPN (Synthetic preparation); **PREP (Preparation)**
(TMSOTf-catalyzed cyclization of catechin and epicatechin in preparation of **procyanidin** B1 and B4)
IT 666233-46-1P
RL: PNU (Preparation, unclassified); **PREP (Preparation)**
(attempted synthesis; TMSOTf-catalyzed cyclization of catechin and epicatechin in preparation of **procyanidin** B1 and B4)
IT **29106-51-2P**, (-)-**Procyanidin** B4
RL: **RCT (Reactant)**; SPN (Synthetic preparation); **PREP (Preparation)**; RACT (Reactant or reagent)
(TMSOTf-catalyzed cyclization of **catechin** and

epicatechin in preparation of **procyanidin** B1 and B4)

RN 29106-51-2 HCAPLUS

CN [4,8'-Bi-2H-1-benzopyran]-3,3',5,5',7,7'-hexol, 2,2'-bis(3,4-dihydroxyphenyl)-3,3',4,4'-tetrahydro-, (2R,2'R,3S,3'R,4S)- (9CI) (CA INDEX NAME)

Absolute stereochemistry. Rotation (-).



RE.CNT 28 THERE ARE 28 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L20 ANSWER 13 OF 34 HCAPLUS COPYRIGHT 2006 ACS on STN

AN 2002:789697 HCAPLUS

DN 138:122474

TI Studies in Polyphenol Chemistry and Bioactivity. 4. Synthesis of Trimeric, Tetrameric, Pentameric, and Higher **Oligomeric** Epicatechin-Derived Procyanidins Having All-4β,8-Interflavan Connectivity and Their Inhibition of Cancer Cell Growth through Cell Cycle Arrest

AU Kozikowski, Alan P.; Tueckmantel, Werner; Boettcher, Gesine; Romanczyk, Leo J., Jr.

CS Department of Neurology, Drug Discovery Laboratory, and Lombardi Cancer Center, Georgetown University Medical Center, Washington, DC, 20007, USA

SO Journal of Organic Chemistry (2003), 68(5), 1641-1658
CODEN: JOCEAH; ISSN: 0022-3263

PB American Chemical Society

DT Journal

LA English

OS CASREACT 138:122474

AB We report an improved synthesis of bis(5,7,3',4'-tetra-O-benzyl)epicatechin 4β,8-dimer from 5,7,3',4'-tetra-O-benzylepicatechin and 5,7,3',4'-tetra-O-benzyl-4-(2-hydroxyethoxy)epicatechin (I) by replacing the previously employed Lewis acid, titanium tetrachloride, with the clay mineral Bentonite K-10. Under the same conditions, the benzyl-protected all-4β,8-trimer, -tetramer, and -pentamer were obtained regioselectively from their lower homologues, albeit in rapidly decreasing yields. Reaction of I with an organoaluminum thiolate generated from 2-mercaptobenzothiazole and trimethylaluminum

followed by **acetylation** produced 3-O-acetyl-4-[(2-benzothiazolyl)thio]-5,7,3',4'-tetra-O-benzylepicatechin (II). Medium-sized protected **oligomers** with 4β,8-interflavan linkages are obtained in improved yields by using this compound as the electrophile and silver tetrafluoroborate as activator and are isolated by reversed-phase HPLC. Their deprotection by ester saponification followed by hydrogenolysis yielded the free procyanidins, which were characterized as their peracetates. The synthetic procyanidins are identical by normal-phase HPLC with fractions isolated from cocoa. The principle of chain extension by two members was demonstrated using a dimeric electrophile obtained by self-condensation of II. Both the synthetic and natural pentamer inhibit the growth of several breast cancer cell lines. Using the MDA MB 231 line, it was established that this outcome is based on the induction of cell cycle arrest in the G0/G1 phase. Subsequent cell death is more likely necrotic rather than apoptotic. Control expts. demonstrate that the polyphenol itself, rather than hydrogen peroxide potentially formed by its autoxidn., is the causative agent.

CC 26-4 (Biomolecules and Their Synthetic Analogs)
Section cross-reference(s): 1

ST epicatechin procyanidin **oligomeric** prepn anticancer

IT Mass spectrometry
(HPLC combined with; anal. of **oligomeric** epicatechin-derived procyanidins having all-4β,8-interflavan connectivity and their anticancer activity)

IT Bentonite, uses
RL: CAT (Catalyst use); USES (Uses)
(K-10; preparation of **oligomeric** epicatechin-derived procyanidins having all-4β,8-interflavan connectivity and their anticancer activity)

IT Condensation reaction
(autocondensation; in preparation of **oligomeric** epicatechin-derived procyanidins having all-4β,8-interflavan connectivity and their anticancer activity)

IT Saponification
(ester; in preparation of **oligomeric** epicatechin-derived procyanidins having all-4β,8-interflavan connectivity and their anticancer activity)

IT Cytometry
(flow; of MBA MB cells)

IT HPLC
(for separation of **oligomeric** epicatechin-derived procyanidins having all-4β,8-interflavan connectivity and their anticancer activity)

IT Hydrogenolysis
(in preparation of **oligomeric** epicatechin-derived procyanidins having all-4β,8-interflavan connectivity and their anticancer activity)

IT Mammary gland, neoplasm
(inhibitor; preparation of **oligomeric** epicatechin-derived procyanidins having all-4β,8-interflavan connectivity and their anticancer activity)

IT HPLC
(mass spectrometry combined with; anal. of **oligomeric** epicatechin-derived procyanidins having all-4β,8-interflavan connectivity and their anticancer activity)

IT Cytotoxicity
(of **oligomeric** epicatechin-derived procyanidins having all-4β,8-interflavan connectivity)

IT **Acetylation**
(preparation of **oligomeric** epicatechin-derived procyanidins having

all-4β,8-interflavan connectivity and their anticancer activity)

IT **Procyanidins**
RL: PAC (Pharmacological activity); SPN (Synthetic preparation); BIOL (Biological study); **PREP (Preparation)**
(preparation of **oligomeric** epicatechin-derived **procyanidins** having all-4β,8-interflavan connectivity and their anticancer activity)

IT 75-24-1, Trimethyl aluminum 7550-45-0, Titanium tetrachloride, uses 14104-20-2, Silver tetrafluoroborate
RL: CAT (Catalyst use); USES (Uses)
(preparation of **oligomeric** epicatechin-derived procyanidins having all-4β,8-interflavan connectivity and their anticancer activity)

IT 37064-30-5P 86631-38-1P 86631-39-2P
RL: PAC (Pharmacological activity); **RCT (Reactant)**; SPN (Synthetic preparation); THU (Therapeutic use); BIOL (Biological study); **PREP (Preparation)**; RACT (Reactant or reagent); USES (Uses)
(preparation of **oligomeric epicatechin**-derived **procyanidins** having all-4β,8-interflavan connectivity and their anticancer activity)

IT 149-30-4, 2(3H)-Benzothiazolethione **490-46-0** 37064-35-0 87292-49-7 256236-25-6
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(preparation of **oligomeric epicatechin**-derived procyanidins having all-4β,8-interflavan connectivity and their anticancer activity)

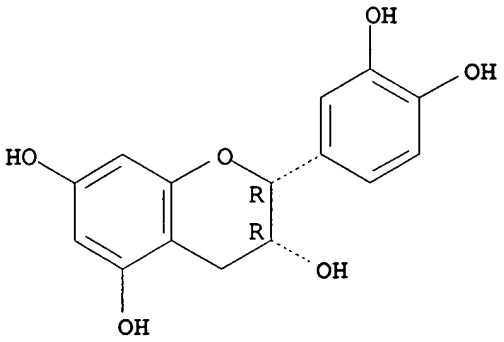
IT 88847-05-6P 101469-10-7P 178458-88-3P 197975-71-6P 223387-28-8P 223387-30-2P 477565-84-7P 477565-85-8P 477565-87-0P 477565-89-2P 477565-90-5P 477565-94-9P 477565-95-0P 477565-96-1P 477565-99-4P 477566-00-0P 479617-14-6P 479617-46-4P 479617-48-6P 479617-51-1P 479617-55-5P 479617-57-7P 479617-58-8P 479617-59-9P 479617-64-6P 479617-66-8P 479617-69-1P
RL: **RCT (Reactant)**; SPN (Synthetic preparation); **PREP (Preparation)**; RACT (Reactant or reagent)
(preparation of **oligomeric epicatechin**-derived **procyanidins** having all-4β,8-interflavan connectivity and their anticancer activity)

IT **29106-49-8P** 82837-96-5P 176703-39-2P 176779-04-7P 477565-86-9P 477565-88-1P 477565-91-6P 477565-93-8P 477565-97-2P 477565-98-3P 477566-01-1P 477566-02-2P 477566-03-3P 477566-04-4P 477566-06-6P 477566-07-7P 477566-08-8P 477566-09-9P 477566-10-2P 477566-11-3P 479617-98-6P 479618-00-3P
RL: SPN (Synthetic preparation); **PREP (Preparation)**
(preparation of **oligomeric** epicatechin-derived **procyanidins** having all-4β,8-interflavan connectivity and their anticancer activity)

IT **490-46-0**
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(preparation of **oligomeric epicatechin**-derived procyanidins having all-4β,8-interflavan connectivity and their anticancer activity)

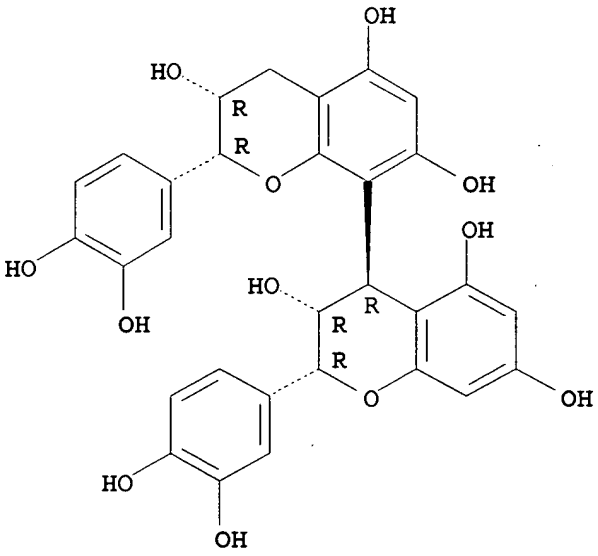
RN 490-46-0 HCAPLUS
CN 2H-1-Benzopyran-3,5,7-triol, 2-(3,4-dihydroxyphenyl)-3,4-dihydro-, (2R,3R)- (9CI) (CA INDEX NAME)

Absolute stereochemistry. Rotation (-).



IT **29106-49-8P**
RL: SPN (Synthetic preparation); **PREP (Preparation)**
(preparation of **oligomeric** epicatechin-derived **procyanidins** having all-4β,8-interflavan connectivity and their anticancer activity)
RN 29106-49-8 HCAPLUS
CN [4,8'-Bi-2H-1-benzopyran]-3,3',5,5',7,7'-hexol, 2,2'-bis(3,4-dihydroxyphenyl)-3,3',4,4'-tetrahydro-, (2R,2'R,3R,3'R,4R)- (9CI) (CA INDEX NAME)

Absolute stereochemistry.



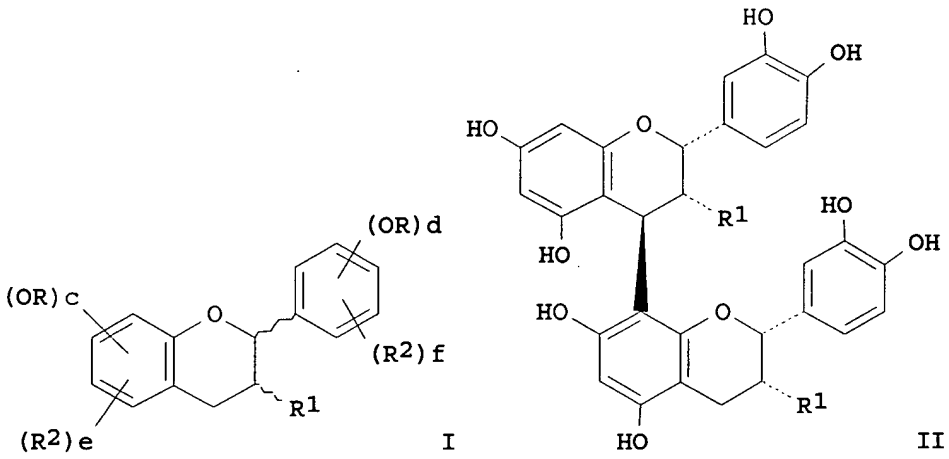
RE.CNT 90 THERE ARE 90 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L20 ANSWER 14 OF 34 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2002:534074 HCAPLUS
DN 137:109159
TI Preparation of polyphenols for use as anticancer agents
IN Romanczyk, Leo J., Jr.; Kozikowski, Alan P.; Tueckmantel, Werner; Lippman, Marc E.
PA Mars Incorporated, USA
SO U.S., 30 pp., Cont.-in-part of U. S. 6,207,842.

CODEN: USXXAM
DT Patent
LA English
FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 6420572	B1	20020716	US 1998-169554	19981009
	US 6207842	B1	20010327	US 1997-948226	19971009
	ES 2189260	T3	20030701	ES 1998-953371	19981009
	US 2002128493	A1	20020912	US 2001-17812	20011214
	US 6528664	B2	20030304		
	US 2003176620	A1	20030918	US 2003-355606	20030131
	US 6849746	B2	20050201		
	US 2004236123	A1	20041125	US 2004-858449	20040528
	US 2004235941	A1	20041125	US 2004-867160	20040614
PRAI	US 1997-948226	A2	19971009		
	US 1998-169554	A1	19981009		
	US 2001-17812	A3	20011214		
	US 2003-355606	A1	20030131		

OS CASREACT 137:109159
GI



AB **Oligomers** of polyphenols, such as I [R = H, hydroxy protecting group; R1 = H, OH, protected hydroxy; R2 = halogen; c = 1-3; d = 1-4; e, f = 0-2] having 2-18 polyphenol monomeric units, which may be the same or different flavanoid monomers, were prepared for their use as anticancer agents. Thus, polyphenol dimer II (R1 = galloyloxy) was prepared via a multistep synthetic sequence starting from (+)-catechin and tri-O-benzylgallic acid. The prepared compds. were tested for cytotoxicity against breast cancer cell lines.

IC ICM C07D311-60
INCL 549400000
CC 26-4 (Biomolecules and Their Synthetic Analogs)
Section cross-reference(s): 1
ST polyphenol epicatechin biflavanoid prepn anticancer; breast cancer inhibitor proanthocyanidin bisgallate trisgallate prepn; coupling reaction flavanol proanthocyanidin **oligomer** prepn
IT Esters, preparation
RL: SPN (Synthetic preparation); PREP (Preparation)
(aromatic; preparation of polyphenol gallates for use as anticancer agents)

IT Protective groups
(benzyl; in preparation of polyphenols for use as anticancer agents)
IT Coupling reaction
(between derivatized, protected monomer with second protected monomer in preparation of polyphenols for use as anticancer agents)
IT Flavonoids
RL: PAC (Pharmacological activity); RCT (Reactant); SPN (Synthetic preparation); THU (Therapeutic use); BIOL (Biological study); PREP (Preparation); RACT (Reactant or reagent); USES (Uses)
(biflavonoids; preparation of polyphenols for use as anticancer agents)
IT Lewis acids
RL: RGT (Reagent); RACT (Reactant or reagent)
(in preparation of polyphenols for use as anticancer agents)
IT Phenols, preparation
RL: PAC (Pharmacological activity); SPN (Synthetic preparation); THU (Therapeutic use); BIOL (Biological study); PREP (Preparation); USES (Uses)
(polyphenols, nonpolymeric; preparation of polyphenols for use as anticancer agents)
IT Antitumor agents
Human
Mammary gland, neoplasm
(preparation of polyphenols for use as anticancer agents)
IT Proanthocyanidins
RL: PAC (Pharmacological activity); SPN (Synthetic preparation); THU (Therapeutic use); BIOL (Biological study); PREP (Preparation); USES (Uses)
(preparation of polyphenols for use as anticancer agents)
IT Flavanols
RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)
(preparation of polyphenols for use as anticancer agents)
IT Halides
RL: RGT (Reagent); RACT (Reactant or reagent)
(titanium tetrahalides, aluminum trihalide and boron trihalide; in preparation of polyphenols for use as anticancer agents)
IT 970-73-0P, Gallocatechin
RL: PAC (Pharmacological activity); RCT (Reactant); SPN (Synthetic preparation); THU (Therapeutic use); BIOL (Biological study); PREP (Preparation); RACT (Reactant or reagent); USES (Uses)
(preparation of polyphenols for use as anticancer agents)
IT 79907-44-1P 106533-62-4P 442626-16-6P 442626-17-7P 442626-19-9P
RL: PAC (Pharmacological activity); SPN (Synthetic preparation); THU (Therapeutic use); BIOL (Biological study); PREP (Preparation); USES (Uses)
(preparation of polyphenols for use as anticancer agents)
IT 100-39-0, Benzyl bromide 107-21-1, Ethylene glycol, reactions
154-23-4, (+)-**Catechin** 446-06-0, Luteoliflavan
490-49-3, Fisetinidol 493-44-7, Tricetiflavan 528-56-3, Robinetinidol
1486-48-2, Tri-O-benzyl gallic acid 2545-00-8, Afzelechin 61402-90-2,
Apigeniflavan 79177-02-9, Propelargonidin 109671-55-8, Prosopin
251909-54-3, Guibourtinidol 256236-21-2 442662-44-4, Oritin
444809-67-0
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(preparation of polyphenols for use as anticancer agents)
IT 20728-73-8P **29106-49-8P** 51079-25-5P 87292-49-7P
87292-54-4P 223387-26-6P 223387-28-8P 223387-30-2P 223387-33-5P
223387-35-7P 223387-36-8P 223387-38-0P 223387-39-1P 223387-40-4P
223387-41-5P 223387-42-6P 223387-43-7P 223387-44-8P 223387-45-9P
223387-46-0P 442626-18-8P 442913-62-4P

RL: RCT (Reactant); SPN (Synthetic preparation); **PREP (Preparation)**; RACT (Reactant or reagent)
(preparation of polyphenols for use as anticancer agents)

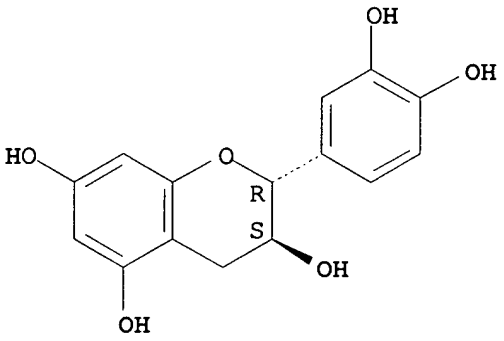
IT 128-08-5, N-Bromosuccinimide 7647-01-0, Hydrochloric acid, reactions 38721-52-7
RL: RGT (Reagent); RACT (Reactant or reagent)
(preparation of polyphenols for use as anticancer agents)

IT **154-23-4**, (+)-**Catechin**
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(preparation of polyphenols for use as anticancer agents)

RN 154-23-4 HCAPLUS

CN 2H-1-Benzopyran-3,5,7-triol, 2-(3,4-dihydroxyphenyl)-3,4-dihydro-, (2R,3S)- (9CI) (CA INDEX NAME)

Absolute stereochemistry. Rotation (+).

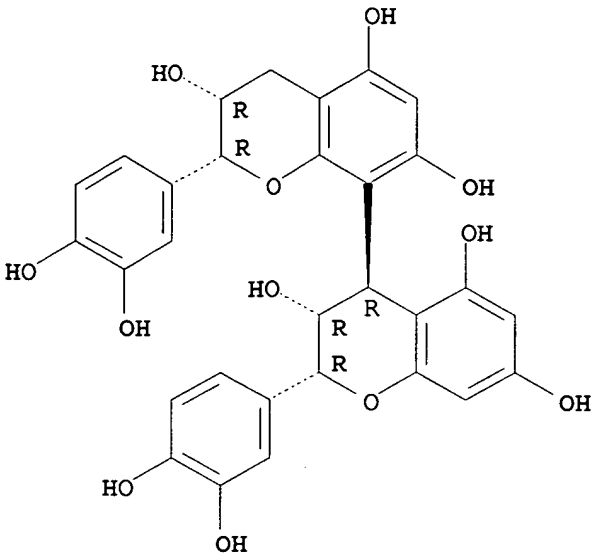


IT **29106-49-8P**
RL: RCT (Reactant); SPN (Synthetic preparation); **PREP (Preparation)**; RACT (Reactant or reagent)
(preparation of polyphenols for use as anticancer agents)

RN 29106-49-8 HCAPLUS

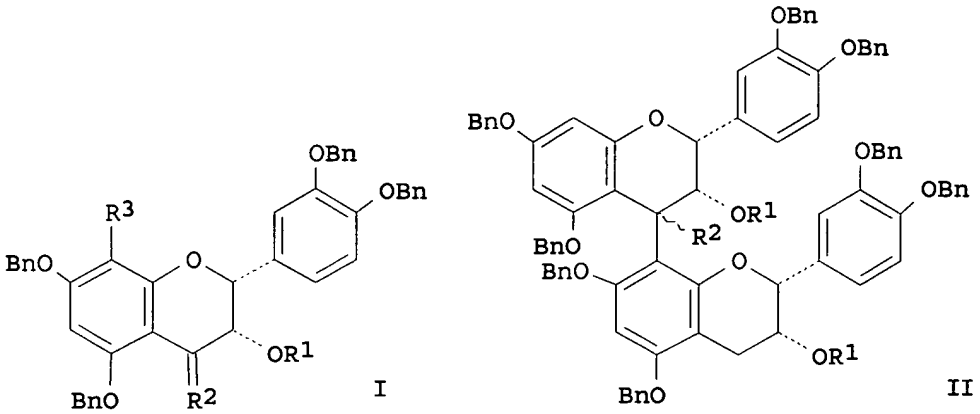
CN [4,8'-Bi-2H-1-benzopyran]-3,3',5,5',7,7'-hexol, 2,2'-bis(3,4-dihydroxyphenyl)-3,3',4,4'-tetrahydro-, (2R,2'R,3R,3'R,4R)- (9CI) (CA INDEX NAME)

Absolute stereochemistry.



RE.CNT 68 THERE ARE 68 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L20 ANSWER 15 OF 34 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2001:68716 HCAPLUS
DN 134:252168
TI Studies in Polyphenol Chemistry and Bioactivity. 3.Stereocontrolled Synthesis of Epicatechin-4α,8-epicatechin, an Unnatural Isomer of the B-Type Procyanidins
AU Kozikowski, Alan P.; Tueckmantel, Werner; Hu, Youhong
CS Drug Discovery Program, Georgetown University Medical Center, Washington, DC, 20007, USA
SO Journal of Organic Chemistry (2001), 66(4), 1287-1296
CODEN: JOCEAH; ISSN: 0022-3263
PB American Chemical Society
DT Journal
LA English
OS CASREACT 134:252168
GI



AB **Oligomeric** procyanidins containing 4α-linked epicatechin units are rare in nature and have hitherto not been accessible through stereoselective synthesis. We report herein the preparation of the prototypical dimer, epicatechin-4α,8-epicatechin, by reaction of the protected 4-ketones I (R1 = Bn, R2 = O, R3 = H), I (R1 = TBDMS, R2 = O, R3 = H) with aryllithium reagents derived by halogen/metal exchange from the aryl bromides I (R1 = Bn, R2 = 2H, R3 = Br), I (R1 = TBDMS; R2 = 2H, R3 = Br). Removal of the 4-hydroxyl group from the resulting tertiary benzylic alcs. II (R1 = Bn, R2 = OH), II (R1 = TBDMS, R2 = OH) was effected by tri-n-butyltin hydride and trifluoroacetic acid in a completely stereoselective manner, resulting in hydride delivery exclusively from the β face. If benzyl was chosen for protection of the 3-hydroxyls, all protective groups could subsequently be removed in a single step by hydrogenolysis. tert-Butyldimethylsilyl groups, on the other hand, permitted selective deprotection of the 3-hydroxyls in preparation for their subsequent acylation with tri-O-benzylgalloyl chloride. Only monogalloylation at the "bottom" 3-hydroxyl took place when II (R1 = H, R2 = β-H) (III) was acylated under the previously reported conditions, reflecting the increased steric hindrance of the "top" 3-hydroxyl group in III compared with its 4β,8-isomer II (R1 = H, R2 = α-H). The preparation of compds. 4α-(2,4,6-trimethoxyphenyl)epicatechin and 4β-(2,4,6-trimethoxyphenyl)epicatechin containing phloroglucinol tri-Me ether in the 4α and 4β linkages to epicatechin is also described. The 8-position of the bromine atom in 5,7,3',4'-tetra-O-benzyl-8-bromocatechin, previously conjectured in analogy to the structurally characterized tetra-Me ether, 5,7,3',4'-tetra-O-methyl-8-bromocatechin, was confirmed by transformation of both compds. into the common derivative 8-benzyl-5,7,3',4'-tetra-O-methylcatechin.

CC 26-4 (Biomolecules and Their Synthetic Analogs)

ST procyanidin asym synthesis hydrogenolysis; galloylepicatechin epicatechin dimer prepn trimethoxyphenyl

IT **Procyanidins**
RL: SPN (Synthetic preparation); **PREP (Preparation)**
(asym. synthesis of epicatechin-4α,8-epicatechin, an unnatural isomer of the B-type **procyanidins**)

IT Flavanols
RL: **RCT (Reactant)**; SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)
(asym. synthesis of galloylepicatechins and **epicatechin** dimers)

IT Hydrogenolysis

(for removal of benzyl protective groups of flavanoids and procyanidins)
IT Asymmetric synthesis and induction
(of epicatechin-4α,8-epicatechin)
IT 100-39-0, Benzyl bromide 100-52-7, Benzaldehyde, reactions 621-23-8
1131-40-4, 1-Bromo-2,4,6-trimethoxybenzene 1486-47-1 51079-25-5
87292-49-7 223387-36-8 256236-21-2 256236-25-6 299412-40-1
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(asym. synthesis of **epicatechin**-4α,8-**epicatechin**, an unnatural isomer of the B-type procyanidins)
IT 20728-79-4P 23671-72-9P 67253-04-7P 78376-75-7P 85443-49-8P
89385-36-4P 223387-39-1P 301539-02-6P 330936-12-4P 330936-13-5P
330936-14-6P 330936-15-7P 330936-16-8P 330936-18-0P 330936-19-1P
330936-20-4P 330936-21-5P 330936-22-6P 330936-23-7P 330936-24-8P
330936-26-0P 330936-27-1P 330936-28-2P 330936-29-3P 330936-30-6P
330936-31-7P 331273-30-4P
RL: **RCT (Reactant)**; SPN (Synthetic preparation); **PREP (Preparation)**; RACT (Reactant or reagent)
(asym. synthesis of **epicatechin**-4α,8-**epicatechin**, an unnatural isomer of the B-type **procyanidins**)
IT 67253-05-8P 330936-17-9P 330936-25-9P 331273-31-5P
RL: SPN (Synthetic preparation); **PREP (Preparation)**
(asym. synthesis of epicatechin-4α,8-epicatechin, an unnatural isomer of the B-type **procyanidins**)
RE.CNT 25 THERE ARE 25 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L20 ANSWER 16 OF 34 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2000:756700 HCAPLUS
DN 133:321764
TI Methods for preparing procyanidin **oligomers**
IN Romanczyk, Leo J.; Basak, Amit; Townsend, Craig A.
PA Mars, Inc., USA
SO PCT Int. Appl., 81 pp.
CODEN: PIXXD2
DT Patent
LA English
FAN.CNT 1

applicants

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI WO 2000063201	A1	20001026	WO 2000-US8249	20000329
W: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW				
RW: GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
US 7015338	B1	20060321	US 1999-292244	19990415
CA 2369799	AA	20001026	CA 2000-2369799	20000329
EP 1175415	A1	20020130	EP 2000-921489	20000329
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
JP 2002542240	T2	20021210	JP 2000-612291	20000329
AU 780897	B2	20050421	AU 2000-41798	20000329
US 2003114691	A1	20030619	US 2002-212973	20020806
US 6864377	B2	20050308		
US 2004176441	A1	20040909	US 2004-798131	20040311

PRAI US 1999-292244 A 19990415
WO 2000-US8249 W 20000329
US 2002-212973 A3 20020806
OS CASREACT 133:321764
AB Processes are disclosed for the production of linear and branched procyanidin **oligomers** having "n" procyanidin monomeric units where n is 2 to 18. The processes include coupling protected, activated monomers with an unprotected monomer to produce a partially protected (4→8) dimer. The dimer is optionally blocked, coupled with an activated protected monomer to produce a partially protected, optionally blocked trimer, and deprotected. The steps can be repeated to produce higher **oligomers.** Processes are also provided for producing (8→8), (8→6), and (6→6) dimers and doubly branched **oligomers.** Crystal structure for 8-bromo tetra-O-benzyl (-)-epicatechin is also reported.
IC ICM C07D311-32
CC 26-4 (Biomolecules and Their Synthetic Analogs)
Section cross-reference(s): 35, 75
ST procyanidin **oligomer** linear branched prepn; group protecting activating blocking masking procyanidin **oligomer** prepn; hydrogenolysis base hydrolysis procyanidin **oligomer** prepn; crystal structure abs configuration bromotetrabenzylepicatechin
IT Protective groups
(acyl groups; in preparation of procyanidin **oligomers**)
IT Hydrolysis
(base; in preparation of procyanidin **oligomers**)
IT Protective groups
(benzyl; in preparation of procyanidin **oligomers**)
IT **Acetylation**
Hydrogenolysis
(in preparation of procyanidin **oligomers**)
IT Coupling reaction catalysts
(lithium bromide; in preparation of procyanidin **oligomers**)
IT **Procyanidins**
RL: BAC (Biological activity or effector, except adverse); BSU (Biological study, unclassified); PRP (Properties); RCT (Reactant); SPN (Synthetic preparation); THU (Therapeutic use); BIOL (Biological study); **PREP (Preparation)**; RACT (Reactant or reagent); USES (Uses)
(methods for preparing **procyanidin** linear and branched **oligomers** including (8→8), (8→6), (6→6) and (6→8) **procyanidin** dimers)
IT Absolute configuration
Crystal structure
(of 8-bromo tetra-O-benzyl-(-)-epicatechin)
IT 223387-36-8P
RL: PRP (Properties); RCT (Reactant); SPN (Synthetic preparation); **PREP (Preparation)**; RACT (Reactant or reagent)
(crystal structure; methods for preparing **procyanidin oligomers**)
IT 14221-01-3, Tetrakis (triphenyl phosphine) palladium
RL: CAT (Catalyst use); USES (Uses)
(in preparing procyanidin **oligomers**)
IT 67-68-5, Dimethylsulfoxide, uses 68-12-2, uses 71-43-2, Benzene, uses 127-19-5, Dimethylacetamide
RL: NUU (Other use, unclassified); USES (Uses)
(in preparation of procyanidin **oligomers**)
IT 64-18-6, Formic acid, reactions 64-19-7, Acetic acid, reactions 79-09-4, Propanoic acid, reactions 109-72-8, n-Butyl lithium, reactions 546-67-8, Lead tetraacetate 594-19-4, tert-Butyl lithium 19183-30-3 302789-28-2, Lead tetraformate

RL: RCT (Reactant); RACT (Reactant or reagent)
(in preparation of procyanidin **oligomers**)

IT 302789-20-4P
RL: BAC (Biological activity or effector, except adverse); BSU (Biological study, unclassified); RCT (Reactant); SPN (Synthetic preparation); THU (Therapeutic use); BIOL (Biological study); **PREP (Preparation)**; RACT (Reactant or reagent); USES (Uses)
(methods for preparing **procyanidin oligomers**)

IT 302789-21-5P 302789-22-6P 302789-30-6P
RL: BAC (Biological activity or effector, except adverse); BSU (Biological study, unclassified); SPN (Synthetic preparation); THU (Therapeutic use); BIOL (Biological study); **PREP (Preparation)**; USES (Uses)
(methods for preparing **procyanidin oligomers**)

IT 100-39-0, Benzyl bromide 108-24-7, Acetic anhydride **154-23-4**, (+)-**Catechin 490-46-0**, (-)-**Epicatechin**
824-94-2, 4-Methoxybenzyl chloride
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(methods for preparing procyanidin **oligomers**)

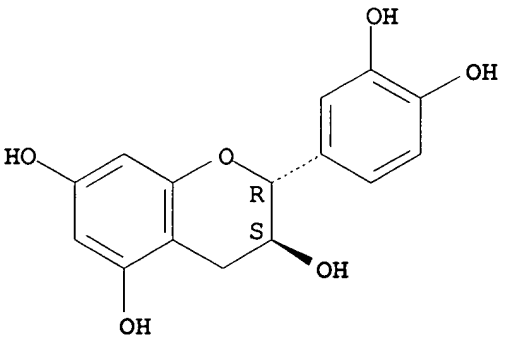
IT 16198-01-9P 20194-41-6P 20728-73-8P **29106-49-8P**
87292-49-7P 137550-05-1P 137624-11-4P 195145-79-0P 223387-39-1P
294203-72-8P 302789-10-2P 302789-11-3P 302789-12-4P 302789-13-5P
302789-14-6P 302789-15-7P 302789-16-8P 302789-17-9P 302789-18-0P
302789-19-1P 302789-25-9P 302917-68-6P
RL: RCT (Reactant); SPN (Synthetic preparation); **PREP (Preparation)**; RACT (Reactant or reagent)
(methods for preparing **procyanidin oligomers**)

IT **29106-51-2P**
RL: SPN (Synthetic preparation); **PREP (Preparation)**
(methods for preparing **procyanidin oligomers**)

IT **154-23-4**, (+)-**Catechin 490-46-0**, (-)-**Epicatechin**
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(methods for preparing procyanidin **oligomers**)

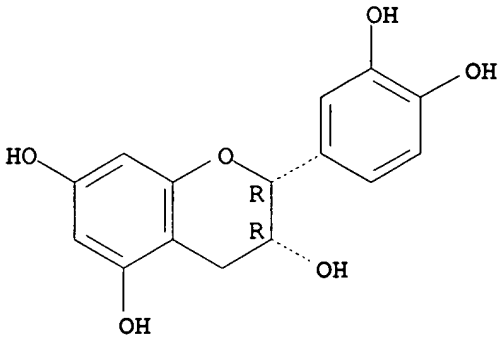
RN 154-23-4 HCAPLUS
CN 2H-1-Benzopyran-3,5,7-triol, 2-(3,4-dihydroxyphenyl)-3,4-dihydro-, (2R,3S)- (9CI) (CA INDEX NAME)

Absolute stereochemistry. Rotation (+).



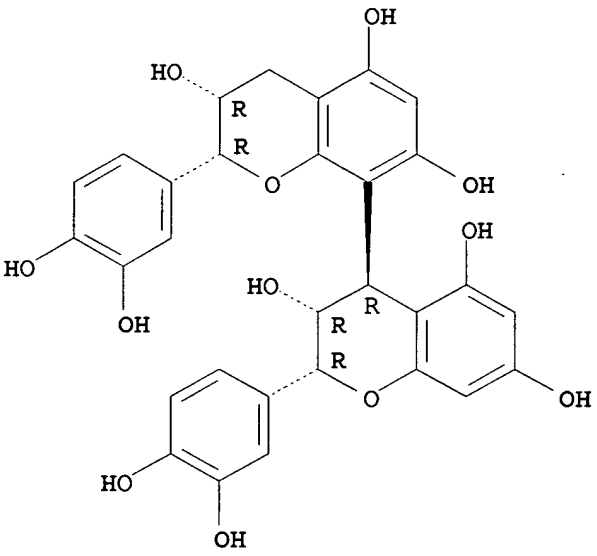
RN 490-46-0 HCAPLUS
CN 2H-1-Benzopyran-3,5,7-triol, 2-(3,4-dihydroxyphenyl)-3,4-dihydro-, (2R,3R)- (9CI) (CA INDEX NAME)

Absolute stereochemistry. Rotation (-).



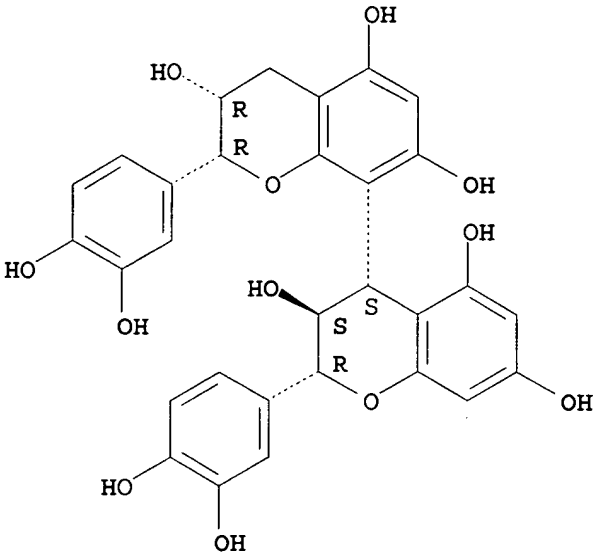
IT **29106-49-8P**
RL: RCT (Reactant); SPN (Synthetic preparation); **PREP (Preparation)**; RACT (Reactant or reagent)
(methods for preparing **procyanidin oligomers**)
RN 29106-49-8 HCAPLUS
CN [4,8'-Bi-2H-1-benzopyran]-3,3',5,5',7,7'-hexol, 2,2'-bis(3,4-dihydroxyphenyl)-3,3',4,4'-tetrahydro-, (2R,2'R,3R,3'R,4R)- (9CI) (CA INDEX NAME)

Absolute stereochemistry.



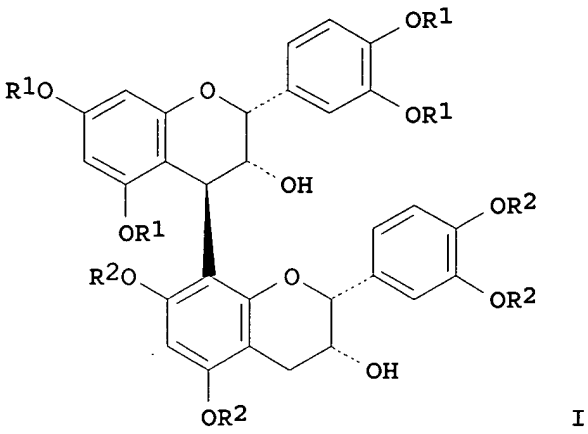
IT **29106-51-2P**
RL: SPN (Synthetic preparation); **PREP (Preparation)**
(methods for preparing **procyanidin oligomers**)
RN 29106-51-2 HCAPLUS
CN [4,8'-Bi-2H-1-benzopyran]-3,3',5,5',7,7'-hexol, 2,2'-bis(3,4-dihydroxyphenyl)-3,3',4,4'-tetrahydro-, (2R,2'R,3S,3'R,4S)- (9CI) (CA INDEX NAME)

Absolute stereochemistry. Rotation (-).



RE.CNT 1 THERE ARE 1 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L20 ANSWER 17 OF 34 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2000:532285 HCAPLUS
DN 133:281621
TI Studies in Polyphenol Chemistry and Bioactivity. 2.Establishment of Interflavan Linkage Regio- and Stereochemistry by Oxidative Degradation of an O-Alkylated Derivative of Procyanidin B2 to (R)-(-)-2,4-Diphenylbutyric Acid
AU Kozikowski, Alan P.; Tueckmantel, Werner; George, Clifford
CS Drug Discovery Program, Georgetown University Medical Center, Washington, DC, 20007, USA
SO Journal of Organic Chemistry (2000), 65(17), 5371-5381
CODEN: JOCEAH; ISSN: 0022-3263
PB American Chemical Society
DT Journal
LA English
OS CASREACT 133:281621
GI



I

AB The assignment of interflavan bond regio- and stereochem. in **oligomeric** proanthocyanidins has in the past relied on empirical spectroscopic techniques which are influenced by the conformation of the C rings. Only recently was the 4,8-regiochem. of procyanidin B2 (I: R1,R2 = H) (II) firmly established by 2-dimensional NMR methods. The proof of 4β-stereochem. in II by oxidative degradation of the derivative I (R1 = CH2Ph, R2 = Me) bearing differential (O-benzyl and O-methyl) protecting groups in its "top" and "bottom" epicatechin moieties, to (R)-(-)-2,4-diphenylbutyric acid has been presented. The key elements of the degradative process are (1) removal of the C-3 alc. functions through a modified Barton deoxygenation employing hypophosphorous acid as the reducing agent; (2) deprotection of the "top" unit by hydrogenolysis, followed by exhaustive aryl triflate formation with N,N-bis(trifluoromethanesulfonyl)aniline and DBU in DMF; (3) hydrogenolytic deoxygenation of the "top" unit over Pearlman's catalyst with concomitant scission of the O-C2 bond; (4) selective oxidation of the "bottom" unit with NaIO4/RuCl3. The hitherto unreported absolute configuration of (-)-2,4-diphenylbutyric acid was established as R by X-ray crystal structure anal. of the (R)-(+)-α-methylbenzylamine salt. As a corollary, the selectivity of hydrogenolytic and solvolytic reactions of epicatechin-derived tetrasulfonates has been investigated.

CC 26-4 (Biomolecules and Their Synthetic Analogs)
Section cross-reference(s): 75

ST procyanidin B2 interflavan linkage stereochem oxidative degrdn; structure crystal methylbenzylammonium diphenylbutyrate abs configuration; deoxygenation Barton oxidn selective bottom unit procyanidin B2; hydrogenolysis triflate formation hydrogenolytic deoxygenation procyanidin B2; solvolytic hydrogenolytic reaction epicatechin tetrasulfonate; configuration abs procyanidin B2 interflavan linkage

IT Deoxidation
(Barton's, hydrogenolytic; in the establishment of interflavan bond regio- and stereochem. of procyanidin B2)

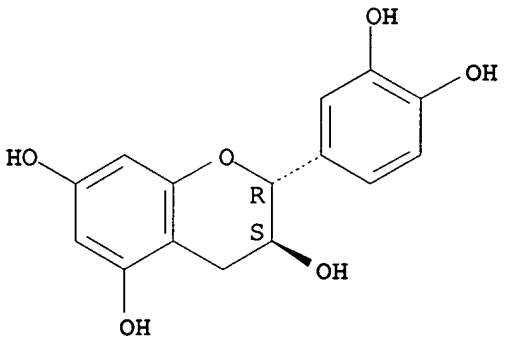
IT Regiochemistry
(establishment of interflavan bond regio- and stereochem. of procyanidin B2)

IT **Procyanidins**
RL: PRP (Properties); RCT (Reactant); SPN (Synthetic preparation); **PREP (Preparation)**; RACT (Reactant or reagent)
(establishment of stereochem. of interflavan linkage of **procyanidin** B2)

IT Absolute configuration

(of interflavan linkage of procyanidin B2)
IT Crystal structure
(of methylbenzylammonium diphenylbutyrate)
IT 299412-57-0P
RL: PRP (Properties); RCT (Reactant); SPN (Synthetic preparation); **PREP (Preparation)**; RACT (Reactant or reagent)
(crystal structure; establishment of stereochem. of interflavan linkage of **procyanidin** B2)
IT 299412-37-6P
RL: BYP (Byproduct); **PREP (Preparation)**
(establishment of stereochem. of interflavan linkage of **procyanidin** B2)
IT 65-85-0, Benzoic acid, reactions 103-63-9 140-29-4, Benzeneacetonitrile **154-23-4**, (+)-**Catechin** 614-47-1, E-Chalcone 883-40-9, Diphenyldiazomethane 1005-56-7 1083-30-3, Dihydrochalcone 3886-69-9 29106-49-8 35388-10-4 87292-49-7 256236-25-6 299412-76-3
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(establishment of stereochem. of interflavan linkage of procyanidin B2)
IT 2901-34-0P 5558-42-9P 17296-93-4P 51079-25-5P 51079-27-7P 51196-02-2P 138571-71-8P 138663-00-0P 299412-38-7P 299412-39-8P 299412-40-1P 299412-41-2P 299412-42-3P 299412-43-4P 299412-44-5P 299412-45-6P 299412-46-7P 299412-48-9P 299412-50-3P 299412-51-4P 299412-52-5P 299412-53-6P 299412-54-7P 299412-55-8P 299412-65-0P 299412-66-1P 299412-73-0P 299412-75-2P
RL: RCT (Reactant); SPN (Synthetic preparation); **PREP (Preparation)**; RACT (Reactant or reagent)
(establishment of stereochem. of interflavan linkage of **procyanidin** B2)
IT 119-61-9P, preparation 632-51-9P, Tetraphenylethylene 983-79-9P, Benzophenone azine 1016-09-7P, Benzhydryl methylether 7515-28-8P 37064-32-7P 40164-60-1P, Methyl 2,4-diphenylbutyrate 55568-98-4P 299412-36-5P 299412-47-8P 299412-49-0P 299412-56-9P 299412-58-1P 299412-59-2P 299412-60-5P 299412-61-6P 299412-62-7P 299412-63-8P 299412-64-9P 299412-67-2P 299412-68-3P 299412-69-4P 299412-70-7P 299412-71-8P 299412-72-9P 299412-74-1P
RL: SPN (Synthetic preparation); **PREP (Preparation)**
(establishment of stereochem. of interflavan linkage of **procyanidin** B2)
IT **154-23-4**, (+)-**Catechin**
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(establishment of stereochem. of interflavan linkage of procyanidin B2)
RN 154-23-4 HCAPLUS
CN 2H-1-Benzopyran-3,5,7-triol, 2-(3,4-dihydroxyphenyl)-3,4-dihydro-, (2R,3S)- (9CI) (CA INDEX NAME)

Absolute stereochemistry. Rotation (+).



RE.CNT 81 THERE ARE 81 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

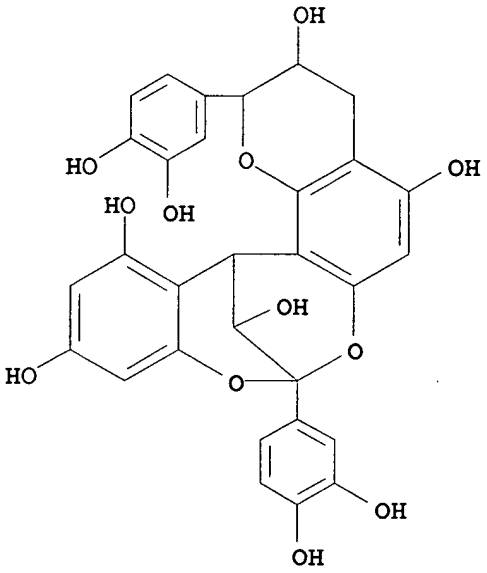
L20 ANSWER 18 OF 34 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2000:85975 HCAPLUS
DN 132:264991
TI Conversion of procyanidin B-type (catechin dimer) to A-type: evidence for abstraction of C-2 hydrogen in catechin during radical oxidation
AU Kondo, Kazunari; Kurihara, Masaaki; Fukuhara, Kiyoshi; Tanaka, Takashi; Suzuki, Takashi; Miyata, Naoki; Toyoda, Masatake
CS Division of Foods, National Institute of Health Sciences, Tokyo, 158-8501, Japan
SO Tetrahedron Letters (2000), 41(4), 485-488
CODEN: TELEAY; ISSN: 0040-4039
PB Elsevier Science Ltd.
DT Journal
LA English
AB Procyanidin B-1 and B-2 were converted into A-1 and A-2 by radical oxidation using 1,1-diphenyl-2-picrylhydrazyl (DPPH) radicals under neutral conditions, resp. Transformation of procyanidin B-type into A-type certainly shows abstraction of the hydrogen atom at the C-2 position during radical oxidation
CC 26-4 (Biomolecules and Their Synthetic Analogs)
Section cross-reference(s): 22
ST procyanidin B radical oxidn procyanidin A; hydrogen abstraction procyanidin B
IT Enthalpy
(bond dissociation; hydrogen abstraction in the conversion of procyanidin B-type (catechin dimer) to A-type)
IT Oxidation
(homolytic; hydrogen abstraction in the conversion of procyanidin B-type (catechin dimer) to A-type)
IT Antioxidants
(hydrogen abstraction in the conversion of procyanidin B-type (catechin dimer) to A-type)
IT Abstraction reaction
Abstraction reaction kinetics
(hydrogen; hydrogen abstraction in the conversion of procyanidin B-type (catechin dimer) to A-type)
IT 20315-25-7, Procyanidin B-1
RL: PEP (Physical, engineering or chemical process); **RCT (Reactant)**; PROC (Process); RACT (Reactant or reagent)
(hydrogen abstraction in the conversion of procyanidin B-type (**catechin** dimer) to A-type)
IT **12798-56-0P**, **Procyanidin** A-1

RL: SPN (Synthetic preparation); **PREP (Preparation)**
(hydrogen abstraction in the conversion of **procyanidin** B-type (catechin dimer) to A-type)

IT **12798-56-0P, Procyanidin** A-1
RL: SPN (Synthetic preparation); **PREP (Preparation)**
(hydrogen abstraction in the conversion of **procyanidin** B-type (catechin dimer) to A-type)

RN 12798-56-0 HCAPLUS

CN 8,14-Methano-2H,14H-1-benzopyrano[7,8-d][1,3]benzodioxocin-3,5,11,13,15-pentol, 2,8-bis(3,4-dihydroxyphenyl)-3,4-dihydro- (9CI) (CA INDEX NAME)



RE.CNT 9 THERE ARE 9 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L20 ANSWER 19 OF 34 HCAPLUS COPYRIGHT 2006 ACS on STN

AN 1999:771159 HCAPLUS

DN 132:122417

TI Studies in Polyphenol Chemistry and Bioactivity. 1. Preparation of Building Blocks from (+)-Catechin. Procyanidin Formation. Synthesis of the Cancer Cell Growth Inhibitor, 3-O-Galloyl-(2R,3R)-epicatechin-4β,8-[3-O-galloyl-(2R,3R)-epicatechin]

AU Tueckmantel, Werner; Kozikowski, Alan P.; Romanczyk, Leo J. ,Jr.

CS Georgetown University Medical Center Institute for Cognitive and Computational Sciences Drug Discovery Program, Washington, DC, 20007, USA

SO Journal of the American Chemical Society (1999), 121(51), 12073-12081
CODEN: JACSAT; ISSN: 0002-7863

PB American Chemical Society

DT Journal

LA English

OS CASREACT 132:122417

GI

* STRUCTURE DIAGRAM TOO LARGE FOR DISPLAY - AVAILABLE VIA OFFLINE PRINT *

AB A project has been initiated to synthesize proanthocyanidin **oligomers** found in cocoa. Natural, readily available (+)-catechin was transformed into 5,7,3',4'-tetra-O-benzyl-(-)-epicatechin (I) by (a) benzylation of the phenolic oxygens; (b) oxidation of the 3-alc. to ketone by the Dess-Martin periodinane; and (c) reduction with lithium tri-sec-butylborohydride (L-Selectride) in the presence of LiBr. The additive diminishes the extent of ketone enolization while maintaining a stereoselectivity of ≥200:1. Oxidation of I with DDQ was performed best from the standpoint of product purification if ethylene glycol was used as the nucleophilic trapping agent. The resulting ether II was condensed with I using TiCl4 to give a good yield of benzyl-protected epicatechin-4β,8-epicatechin (octa-O-benzylprocyanidin B2, III) as the sole dimeric product. Hydrogenolysis of III yielded procyanidin B2 in the first enantiospecific synthesis of this natural product which employs protected intermediates and thereby allows the necessary product separation after the condensation step to be performed on nonpolar, nonsensitive intermediates. Acylation of III with tri-O-benzylgalloyl chloride followed by hydrogenolysis gave access to the title bis-gallate IV [R = COC6H2(OH)3-3,4,5]. This constitutes the first synthesis of this natural product, a compound notable for its PKC-inhibitory and anticancer activity.

CC 26-4 (Biomolecules and Their Synthetic Analogs)

ST proanthocyanidin **oligomer** cocoa enantiospecific synthesis; catechin conversion galloylepicatechin dimer; galloylepicatechin dimer enantiospecific synthesis

IT Synthons
(chiral; synthesis of [(2R,3R)-3-O-galloylepicatechin]-4β,8-[-(2R,3R)-3-O-galloylepicatechin] from (+)-catechin)

IT Proanthocyanidins
RL: SPN (Synthetic preparation); PREP (Preparation)
(**oligomers**; synthesis of [(2R,3R)-3-O-galloylepicatechin]-4β,8-[-(2R,3R)-3-O-galloylepicatechin] from (+)-catechin)

IT Stereoselective synthesis
(synthesis of [(2R,3R)-3-O-galloylepicatechin]-4β,8-[-(2R,3R)-3-O-galloylepicatechin] from (+)-catechin)

IT 256236-26-7P 256236-27-8P 256236-28-9P 256236-29-0P
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
(synthesis of [(2R,3R)-3-O-galloylepicatechin]-4β,8-[-(2R,3R)-3-O-galloylepicatechin] from (+)-catechin)

IT **154-23-4**, (+)-**Catechin** 1486-48-2, Tri-O-benzylgallic acid
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(synthesis of [(2R,3R)-3-O-galloylepicatechin]-4β,8-[-(2R,3R)-3-O-galloylepicatechin] from (+)-**catechin**)

IT 20728-73-8P, 5,7,3',4'-Tetra-O-benzylcatechin **29106-49-8P**, (+)-**Procyanidin** B2 79907-44-1P, (2R,3R)-3-O-Galloylepicatechin-4β,8-[(2R,3R)-3-O-galloylepicatechin] 87292-49-7P, (-)-5,7,3',4'-Tetra-O-benzylepicatechin 87292-54-4P, (R)-5,7,3',4'-Tetrakis(benzyloxy)flavan-3-one 223387-28-8P 223387-33-5P 223387-38-0P, (R)-8-Bromo-5,7,3',4'-tetrakis(benzyloxy)flavan-3-one 256236-21-2P, (-)-5,7,3',4'-Tetra-O-benzyl-8-bromocatechin 256236-25-6P 256236-30-3P, (-)-5,7,3',4'-Tetra-O-benzyl-3-O-(3,4,5-tri-O-benzylgalloyl)**epicatechin**
RL: **RCT (Reactant)**; SPN (Synthetic preparation); **PREP (Preparation)**; RACT (Reactant or reagent)
(synthesis of [(2R,3R)-3-O-galloylepicatechin]-4β,8-[-(2R,3R)-3-O-galloylepicatechin] from (+)-**catechin**)

IT 1257-08-5P, 3-O-Galloylepicatechin 21179-21-5P, (+)-**Procyanidin** B2 decaacetate 223387-36-8P, (-)-8-Bromo-5,7,3',4'-tetra-O-benzylepicatechin 256236-22-3P 256236-23-4P 256236-24-5P 256236-31-4P

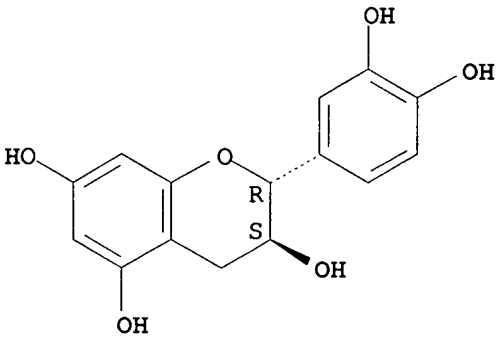
RL: SPN (Synthetic preparation); **PREP (Preparation)**
(synthesis of [(2R,3R)-3-O-galloylepicatechin]-4β,8-[-(2R,3R)-3-O-galloylepicatechin] from (+)-catechin)

IT **154-23-4**, (+)-**Catechin**
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(synthesis of [(2R,3R)-3-O-galloylepicatechin]-4β,8-[-(2R,3R)-3-O-galloylepicatechin] from (+)-**catechin**)

RN 154-23-4 HCAPLUS

CN 2H-1-Benzopyran-3,5,7-triol, 2-(3,4-dihydroxyphenyl)-3,4-dihydro-, (2R,3S)- (9CI) (CA INDEX NAME)

Absolute stereochemistry. Rotation (+).

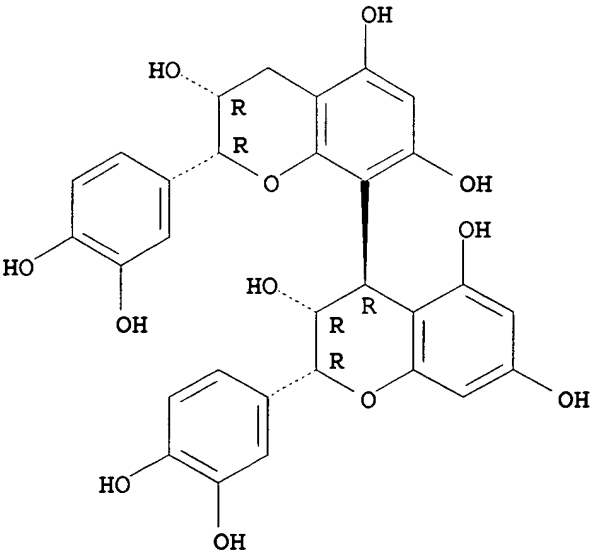


IT **29106-49-8P**, (+)-**Procyanidin** B2
RL: **RCT (Reactant)**; SPN (Synthetic preparation); **PREP (Preparation)**; RACT (Reactant or reagent)
(synthesis of [(2R,3R)-3-O-galloylepicatechin]-4β,8-[-(2R,3R)-3-O-galloylepicatechin] from (+)-**catechin**)

RN 29106-49-8 HCAPLUS

CN [4,8'-Bi-2H-1-benzopyran]-3,3',5,5',7,7'-hexol, 2,2'-bis(3,4-dihydroxyphenyl)-3,3',4,4'-tetrahydro-, (2R,2'R,3R,3'R,4R)- (9CI) (CA INDEX NAME)

Absolute stereochemistry.

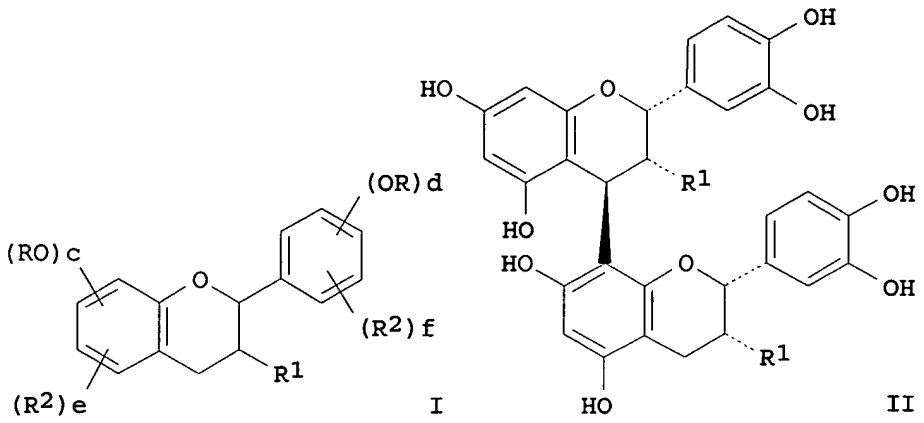


RE.CNT 201 THERE ARE 201 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L20 ANSWER 20 OF 34 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1999:271349 HCAPLUS
DN 130:296545
TI Preparation of polyphenols for use as anticancer agents
IN Romanczyk, Leo J., J.; Kozikowski, Alan P.; Tueckmantel, Werner; Lippman, Marc E.
PA Mars Incorporated, USA
SO PCT Int. Appl., 108 pp.
CODEN: PIXXD2
DT Patent
LA English
FAN.CNT 2

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 9919319	A1	19990422	WO 1998-US21392	19981009
	W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
	RW: GH, GM, KE, LS, MW, SD, SZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
	US 6207842	B1	20010327	US 1997-948226	19971009
	CA 2306851	AA	19990422	CA 1998-2306851	19981009
	AU 9910766	A1	19990503	AU 1999-10766	19981009
	AU 760031	B2	20030508		
	EP 1027345	A1	20000816	EP 1998-953371	19981009
	EP 1027345	B1	20030219		
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, FI				
	JP 2001519426	T2	20011023	JP 2000-515891	19981009
	AT 232857	E	20030315	AT 1998-953371	19981009
	ES 2189260	T3	20030701	ES 1998-953371	19981009
	MX 200003249	A	20001110	MX 2000-3249	20000403
	US 2004236123	A1	20041125	US 2004-858449	20040528
PRAI	US 1997-948226	A	19971009		
	WO 1998-US21392	W	19981009		
	US 2001-17812	A3	20011214		
	US 2003-355606	A1	20030131		

GI



AB **Oligomers** of polyphenols I [R = H, hydroxy protecting group; R1 = H, OH, protected hydroxy; R2 = H, halogen; c = 1-3, d = 1-4, e, f = 0-2] having 2-18 polyphenol monomeric units, which may be the same or different flavanoid monomers, were prepared for use as anticancer agents. Thus, polyphenol dimer II (R1 = galloyloxy) in a multistep synthetic sequence starting from (+)-catechin and tri-O-benzylgallic acid. The prepared compds. were tested for cytotoxicity and cell proliferation inhibition against breast cancer cell lines.

IC ICM C07D311-62
ICS C07D311-60; C07D311-32; C07H017-06; A61K031-35

CC 26-4 (Biomolecules and Their Synthetic Analogs)
Section cross-reference(s): 1

ST polyphenol flavanol prepn anticancer agent; catechin **oligomer** polyphenol prepn anticancer agent; epicatechin **oligomer** prepn breast cancer inhibitor; breast cancer inhibitor polyphenol flavanol prepn; cell proliferation catechin **oligomer** polyphenol prepn; antiproliferative agent catechin **oligomer** polyphenol prepn

IT Antitumor agents
(mammary gland; preparation of polyphenols for use as anticancer agents)

IT Mammary gland
(neoplasm, inhibitors; preparation of polyphenols for use as anticancer agents)

IT Antitumor agents
Cytotoxic agents
(preparation of polyphenols for use as anticancer agents)

IT Flavanols
RL: BAC (Biological activity or effector, except adverse); BSU (Biological study, unclassified); SPN (Synthetic preparation); THU (Therapeutic use); BIOL (Biological study); PREP (Preparation); USES (Uses)
(preparation of polyphenols for use as anticancer agents)

IT Proliferation inhibition
(proliferation inhibitors; preparation of polyphenols for use as anticancer agents)

IT 20728-73-8P 87292-49-7P 87292-54-4P 223387-26-6P 223387-28-8P 223387-30-2P 223387-33-5P 223387-35-7P 223387-36-8P 223387-38-0P 223387-42-6P 223387-45-9P
RL: BAC (Biological activity or effector, except adverse); BSU (Biological study, unclassified); RCT (Reactant); SPN (Synthetic preparation); THU (Therapeutic use); BIOL (Biological study); PREP (Preparation); RACT (Reactant or reagent); USES (Uses)
(preparation of polyphenols for use as anticancer agents)

IT **29106-49-8P** 79907-44-1P 88038-01-1P 88489-00-3P
106533-62-4P 223387-39-1P 223387-40-4P 223387-41-5P 223387-43-7P
223387-44-8P 223387-46-0P 223387-47-1P 223387-48-2P 223387-49-3P
223387-50-6P
RL: BAC (Biological activity or effector, except adverse); BSU (Biological study, unclassified); SPN (Synthetic preparation); THU (Therapeutic use); BIOL (Biological study); **PREP (Preparation)**; USES (Uses)
(preparation of polyphenols for use as anticancer agents)

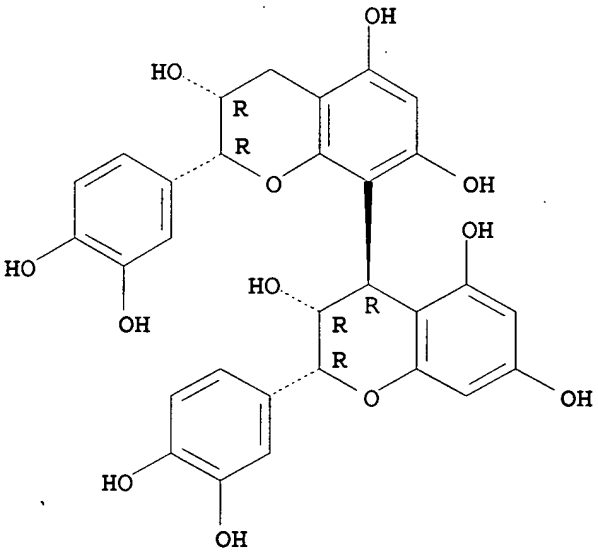
IT 100-39-0, Benzyl bromide 107-21-1, 1,2-Ethanediol, reactions
154-23-4, (+)-Catechin 490-46-0, (-)-Epicatechin 1486-48-2, Tri-O-benzyl gallic acid 223387-51-7
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(preparation of polyphenols for use as anticancer agents)

IT **29106-49-8P**
RL: BAC (Biological activity or effector, except adverse); BSU (Biological study, unclassified); SPN (Synthetic preparation); THU (Therapeutic use); BIOL (Biological study); **PREP (Preparation)**; USES (Uses)
(preparation of polyphenols for use as anticancer agents)

RN 29106-49-8 HCAPLUS

CN [4,8'-Bi-2H-1-benzopyran]-3,3',5,5',7,7'-hexol, 2,2'-bis(3,4-dihydroxyphenyl)-3,3',4,4'-tetrahydro-, (2R,2'R,3R,3'R,4R)- (9CI) (CA INDEX NAME)

Absolute stereochemistry.

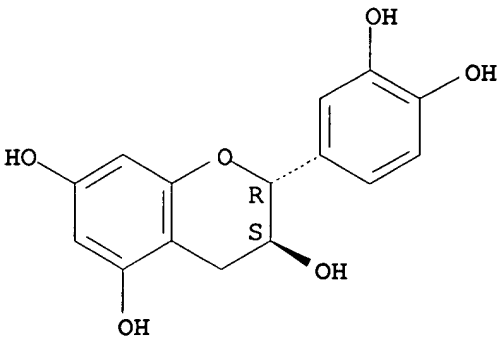


IT **154-23-4, (+)-Catechin 490-46-0, (-)-Epicatechin**
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(preparation of polyphenols for use as anticancer agents)

RN 154-23-4 HCAPLUS

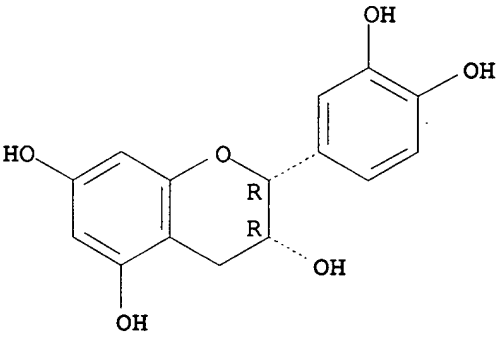
CN 2H-1-Benzopyran-3,5,7-triol, 2-(3,4-dihydroxyphenyl)-3,4-dihydro-, (2R,3S)- (9CI) (CA INDEX NAME)

Absolute stereochemistry. Rotation (+).



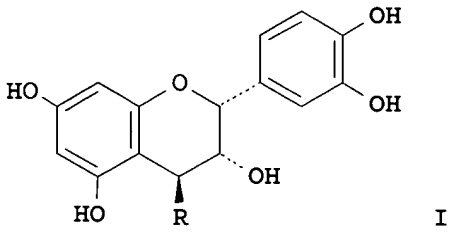
RN 490-46-0 HCAPLUS
CN 2H-1-Benzopyran-3,5,7-triol, 2-(3,4-dihydroxyphenyl)-3,4-dihydro-, (2R,3R)- (9CI) (CA INDEX NAME)

Absolute stereochemistry. Rotation (-).

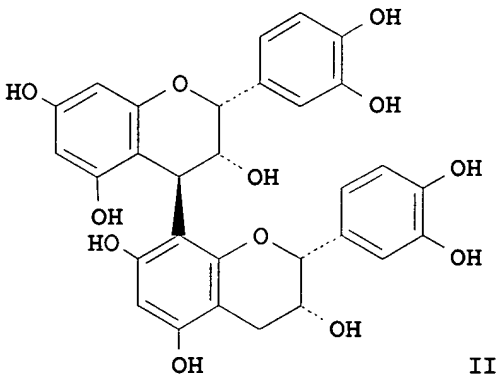


RE.CNT 9 THERE ARE 9 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L20 ANSWER 21 OF 34 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1998:417444 HCAPLUS
DN 129:189143
TI **Oligomeric** flavanoids. Part 27. Interflavanyl bond formation in procyanidins under neutral conditions
AU Steynberg, Petrus J.; Nel, Reinier J. J.; Van Rensburg, Hendrik; Bezuidenhoudt, Barend C. B.; Ferreira, Daneel
CS Dep. Chem., Univ. Orange Free State, Bloemfontein, 9300, S. Afr.
SO Tetrahedron (1998), 54(28), 8153-8158
CODEN: TETRAB; ISSN: 0040-4020
PB Elsevier Science Ltd.
DT Journal
LA English
OS CASREACT 129:189143
GI



I



II

AB Dimethyl(methylthio)sulfonium tetrafluoroborate (DMTSF) and silver tetrafluoroborate (AgBF4) activate the C4-S bond in the 4-thioethers of flavan-3-ols, e.g. I (R = SCH2Ph), toward carbon nucleophiles, e.g. I [R = H (epicatechin)], to permit formation of the interflavanyl bond in procyanidins, e.g. II (procyanidin B-2), under neutral conditions.

CC 26-4 (Biomolecules and Their Synthetic Analogs)

ST procyanidin prepn; flavanoid **oligomeric** prepn; flavanol thioether interflavanyl bond formation; tetrafluoroborate silver dimethylmethylthiosulfonium activation flavanol thioether

IT Bond formation
(C-C; interflavanyl bond formation of flavanol thioether under neutral conditions in preparation of procyanidins)

IT Flavonoids
RL: RCT (Reactant); SPN (Synthetic preparation); **PREP (Preparation)**; RACT (Reactant or reagent)
(interflavanyl bond formation of flavanol thioether under neutral conditions in preparation of **procyanidins**)

IT **Procyanidins**
RL: SPN (Synthetic preparation); **PREP (Preparation)**
(interflavanyl bond formation of flavanol thioether under neutral conditions in preparation of **procyanidins**)

IT 79813-67-5P
RL: BYP (Byproduct); **PREP (Preparation)**
(interflavanyl bond formation of flavanol thioether under neutral conditions in preparation of **procyanidins**)

IT 100-53-8, Phenylmethanethiol 108-73-6, Phloroglucinol **154-23-4**, **Catechin** 480-18-2, (2R,3R)-Dihydroquercetin **490-46-0**, **Epicatechin** 5799-67-7, Dimethyl(methylthio)sulfonium tetrafluoroborate 14104-20-2, Silver tetrafluoroborate
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(interflavanyl bond formation of flavanol thioether under neutral conditions in preparation of procyanidins)

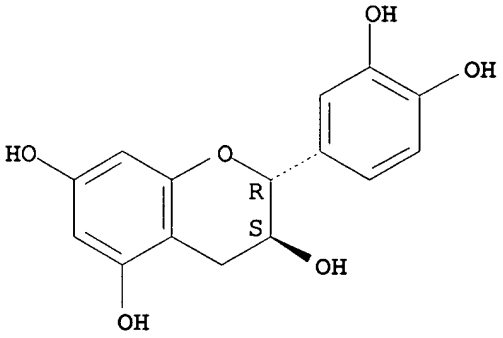
IT 23567-23-9P, **Procyanidin** B-3 37064-35-0P, 4β-(Benzylsulfanyl)**epicatechin** 37064-38-3P, 4β-(Benzylsulfanyl)**catechin**
RL: **RCT (Reactant)**; SPN (Synthetic preparation); **PREP (Preparation)**; RACT (Reactant or reagent)
(interflavanyl bond formation of flavanol thioether under neutral conditions in preparation of **procyanidins**)

IT 20315-25-7P, **Procyanidin** B-1 **29106-49-8P**, **Procyanidin** B-2 **29106-51-2P**, **Procyanidin** B-4 37064-31-6P, **Procyanidin** C-2 61541-02-4P, Epicatechin-(4β→2)-phloroglucinol 211810-99-0P
RL: SPN (Synthetic preparation); **PREP (Preparation)**
(interflavanyl bond formation of flavanol thioether under neutral conditions in preparation of **procyanidins**)

IT **154-23-4**, **Catechin** 490-46-0, **Epicatechin**
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(interflavanyl bond formation of flavanol thioether under neutral conditions in preparation of procyanidins)

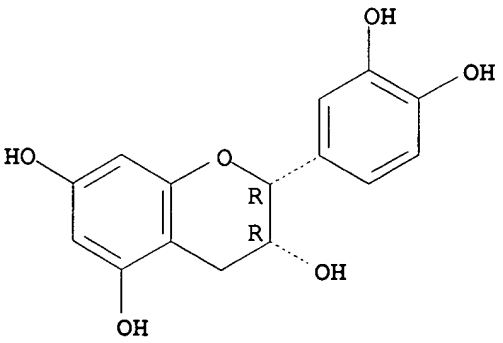
RN 154-23-4 HCAPLUS
CN 2H-1-Benzopyran-3,5,7-triol, 2-(3,4-dihydroxyphenyl)-3,4-dihydro-, (2R,3S)- (9CI) (CA INDEX NAME)

Absolute stereochemistry. Rotation (+).



RN 490-46-0 HCAPLUS
CN 2H-1-Benzopyran-3,5,7-triol, 2-(3,4-dihydroxyphenyl)-3,4-dihydro-, (2R,3R)- (9CI) (CA INDEX NAME)

Absolute stereochemistry. Rotation (-).

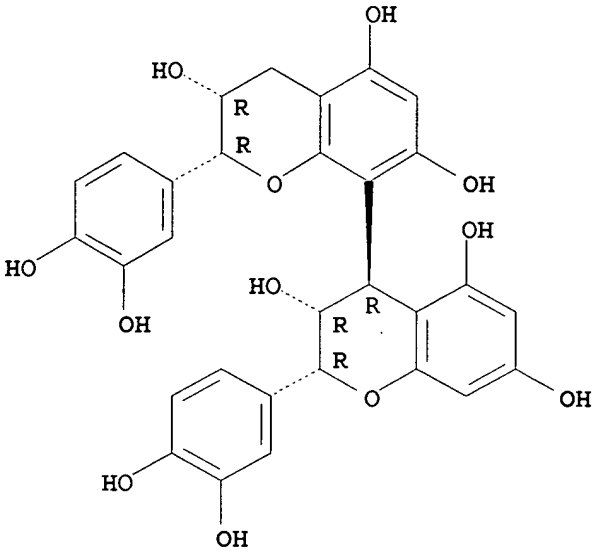


IT **29106-49-8P**, **Procyanidin** B-2 **29106-51-2P**,

Procyanidin B-4
RL: SPN (Synthetic preparation); **PREP (Preparation)**
(interflavanyl bond formation of flavanol thioether under neutral conditions in preparation of **procyanidins**)

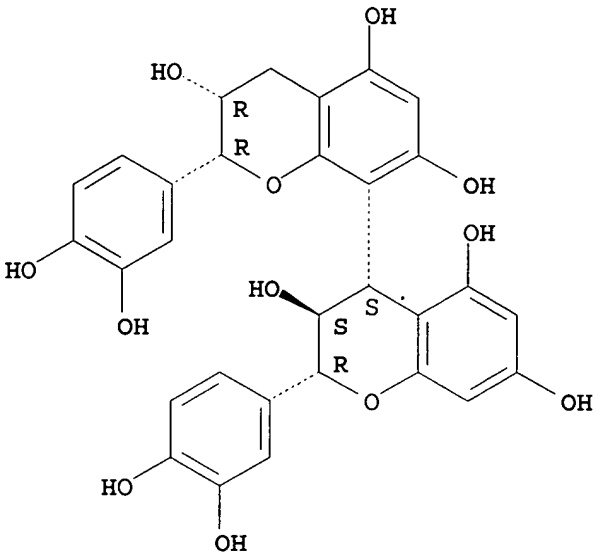
RN 29106-49-8 HCAPLUS
CN [4,8'-Bi-2H-1-benzopyran]-3,3',5,5',7,7'-hexol, 2,2'-bis(3,4-dihydroxyphenyl)-3,3',4,4'-tetrahydro-, (2R,2'R,3R,3'R,4R)- (9CI) (CA INDEX NAME)

Absolute stereochemistry.



RN 29106-51-2 HCAPLUS
CN [4,8'-Bi-2H-1-benzopyran]-3,3',5,5',7,7'-hexol, 2,2'-bis(3,4-dihydroxyphenyl)-3,3',4,4'-tetrahydro-, (2R,2'R,3S,3'R,4S)- (9CI) (CA INDEX NAME)

Absolute stereochemistry. Rotation (-).



RE.CNT 18 THERE ARE 18 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L20 ANSWER 22 OF 34 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1998:13652 HCAPLUS
DN 128:79993
TI Pharmaceutical compositions containing proanthocyanidin **oligomers** for the prevention or treatment of cataracts
IN Yamakoshi, Jun; Ariga, Toshiaki; Ishikawa, Hiroharu; Iwai, Yukihiko; Manaka, Tatuo; Kataoka, Shigehiro; Yuasa, Katsumi; Kikuchi, Mamoru
PA Kikkoman Corporation, Japan
SO Eur. Pat. Appl., 15 pp.
CODEN: EPXXDW
DT Patent
LA English
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 812592	A1	19971217	EP 1997-100538	19970115
	R: DE, FR, GB, IT				
	JP 10059846	A2	19980303	JP 1996-307514	19961105
	US 5804597	A	19980908	US 1997-779097	19970106
PRAI	JP 1996-168664	A	19960610		
	JP 1996-307514	A	19961105		

OS MARPAT 128:79993
AB Pharmaceutical compns. for the prevention or treatment of cataracts comprising a proanthocyanidin **oligomer** is provided. The oral administration or application to the eyes of the agent of the invention produces a sufficient preventive or therapeutic effect against cataracts caused by oxidative disorders. A synthetic reaction was carried out using 50 g of (±)-dihydroquercetin, 50 g of (+)-catechin, and sodium borohydride as starting materials. After the completion of the reaction, the pH of the reaction solution was adjusted to 5.0 with acetic acid, and then an extraction operation was conducted using Et acetate. The extract was then
concentrated and purified to obtain 5.11 g procyanidin B-3 (I). The anti-cataracts efficacy of oral and topical I was shown in rats. An eye

drop contained I 1.0, boric acid 0.7, sodium chloride 0.6, Me p-oxybenzoate 0.02, and chlorobutanol 0.3g.

IC ICM A61K035-78
ICS A61K031-35

CC 63-6 (Pharmaceuticals)
Section cross-reference(s): 1, 27

ST pharmaceutical compn proanthocyanidin **oligomer** cataract treatment; eye drop procyanidin B3 cataract

IT Proanthocyanidins
RL: BAC (Biological activity or effector, except adverse); BSU (Biological study, unclassified); SPN (Synthetic preparation); THU (Therapeutic use); BIOL (Biological study); PREP (Preparation); USES (Uses)
(**oligomers**; pharmaceutical compns. containing proanthocyanidin **oligomers** for prevention or treatment of cataracts)

IT Cataract
(pharmaceutical compns. containing proanthocyanidin **oligomers** for prevention or treatment of cataracts)

IT Grape
(seeds exts.; pharmaceutical compns. containing proanthocyanidin **oligomers** for prevention or treatment of cataracts)

IT Drug delivery systems
(solns., ophthalmic; pharmaceutical compns. containing proanthocyanidin **oligomers** for prevention or treatment of cataracts)

IT Drug delivery systems
(tablets; pharmaceutical compns. containing proanthocyanidin **oligomers** for prevention or treatment of cataracts)

IT 23567-23-9P, **Procyanidin** B-3
RL: BAC (Biological activity or effector, except adverse); BSU (Biological study, unclassified); SPN (Synthetic preparation); THU (Therapeutic use); BIOL (Biological study); **PREP (Preparation)**; USES (Uses)
(pharmaceutical compns. containing proanthocyanidin **oligomers** for prevention or treatment of cataracts)

IT 1481-83-0D, Flavan-3-ol, **oligomers** 5023-02-9D, Flavan-3,4-diol, **oligomers**
RL: BAC (Biological activity or effector, except adverse); BSU (Biological study, unclassified); THU (Therapeutic use); BIOL (Biological study); USES (Uses)
(pharmaceutical compns. containing proanthocyanidin **oligomers** for prevention or treatment of cataracts)

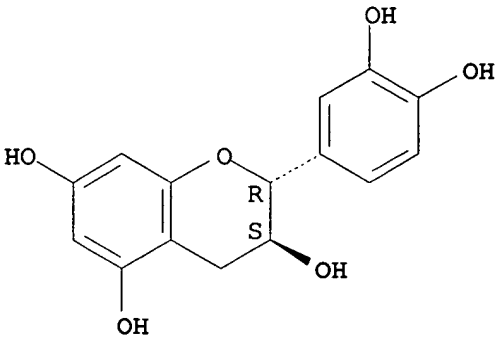
IT **154-23-4**, (+)-**Catechin** 24198-97-8, (±)-Dihydroquercetin
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(pharmaceutical compns. containing proanthocyanidin **oligomers** for prevention or treatment of cataracts)

IT **154-23-4**, (+)-**Catechin**
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(pharmaceutical compns. containing proanthocyanidin **oligomers** for prevention or treatment of cataracts)

RN 154-23-4 HCAPLUS

CN 2H-1-Benzopyran-3,5,7-triol, 2-(3,4-dihydroxyphenyl)-3,4-dihydro-, (2R,3S)- (9CI) (CA INDEX NAME)

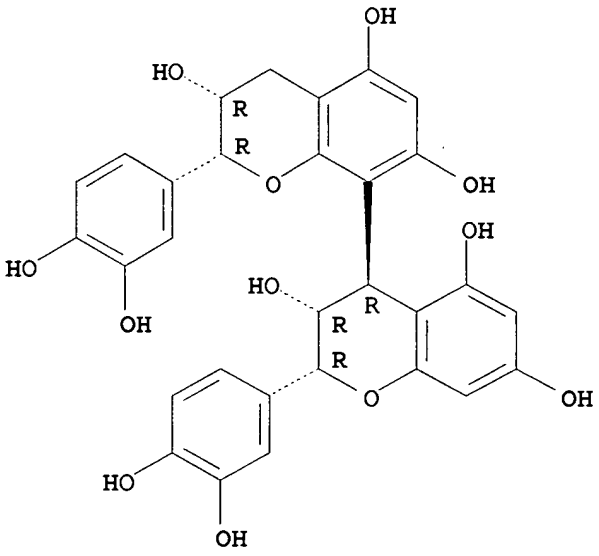
Absolute stereochemistry. Rotation (+).



L20 ANSWER 23 OF 34 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1997:749684 HCAPLUS
DN 128:99202
TI Flavan dimers with lipase inhibitory activity from Cassia nomame
AU Hatano, Tsutomu; Yamashita, Akiko; Hashimoto, Toshitaka; Ito, Hideyuki; Kubo, Naoki; Yoshiyama, Masaaki; Shimura, Susumu; Itoh, Yoshio; Okuda, Takuo; Yoshida, Takashi
CS Faculty of Pharmaceutical Sciences, Okayama University, Okayama, 700, Japan
SO Phytochemistry (1997), 46(5), 893-900
CODEN: PYTCAS; ISSN: 0031-9422
PB Elsevier Science Ltd.
DT Journal
LA English
AB Five flavan dimers which showed lipase-inhibiting effects were isolated from fruits of Cassia nomame (Leguminosae). Structures of two new compds. among them were determined to be (2S)-3',4',7-trihydroxyflavan-(4β → 8)-catechin and (2S)-3',4',7-trihydroxyflavan-(4α → 8)-catechin. Four flavan dimers structurally related to these two compds. were also synthesized for spectral comparison. Among 10 flavan dimers tested for lipase-inhibitory activity, (2S)-3',4',7-trihydroxyflavan-(4α → 8)-catechin showed the most potent inhibitory effect. A partially purified fraction composed of **oligomeric** flavans with Mn 1020 also showed a noticeable inhibitory effect.
CC 7-3 (Enzymes)
ST lipase inhibitor flavan prepn
IT Structure-activity relationship
(lipase-inhibiting; flavan dimers with lipase inhibitory activity from Cassia nomame)
IT 20315-25-7P 23567-23-9P **29106-49-8P 29106-51-2P**
78306-07-7P 162753-74-4P 162869-46-7P 201301-88-4P 201301-89-5P
201301-90-8P 201301-91-9P 201301-92-0P
RL: BAC (Biological activity or effector, except adverse); BSU (Biological study, unclassified); PRP (Properties); SPN (Synthetic preparation); BIOL (Biological study); **PREP (Preparation)**
(flavan dimers with lipase inhibitory activity from Cassia nomame)
IT 494-12-2P, Flavan
RL: BAC (Biological activity or effector, except adverse); BSU (Biological study, unclassified); SPN (Synthetic preparation); BIOL (Biological study); PREP (Preparation)
(flavan dimers with lipase inhibitory activity from Cassia nomame)
IT 9001-62-1, Lipase
RL: BPR (Biological process); BSU (Biological study, unclassified); BIOL (Biological study); PROC (Process)

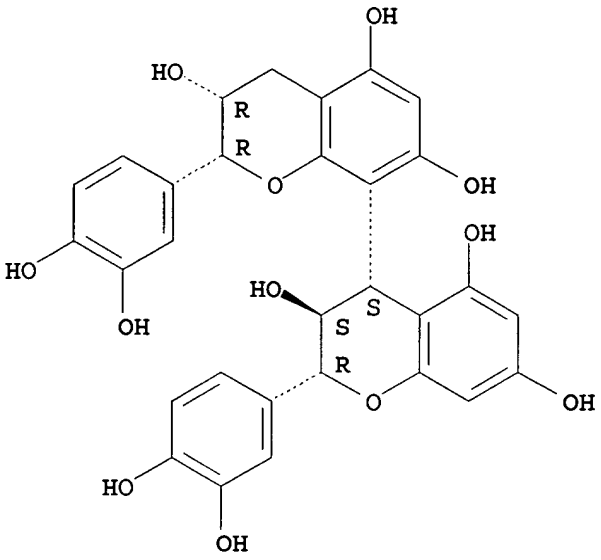
(flavan dimers with lipase inhibitory activity from Cassia nomame)
IT 578-86-9 69097-97-8 201301-98-6
RL: PRP (Properties); RCT (Reactant); RACT (Reactant or reagent)
(flavan dimers with lipase inhibitory activity from Cassia nomame)
IT **154-23-4P** 82925-54-0P 201302-01-4P
RL: PRP (Properties); **RCT (Reactant)**; SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)
(flavan dimers with lipase inhibitory activity from Cassia nomame)
IT **29106-49-8P 29106-51-2P**
RL: BAC (Biological activity or effector, except adverse); BSU (Biological study, unclassified); PRP (Properties); SPN (Synthetic preparation); BIOL (Biological study); **PREP (Preparation)**
(flavan dimers with lipase inhibitory activity from Cassia nomame)
RN 29106-49-8 HCAPLUS
CN [4,8'-Bi-2H-1-benzopyran]-3,3',5,5',7,7'-hexol, 2,2'-bis(3,4-dihydroxyphenyl)-3,3',4,4'-tetrahydro-, (2R,2'R,3R,3'R,4R)- (9CI) (CA INDEX NAME)

Absolute stereochemistry.



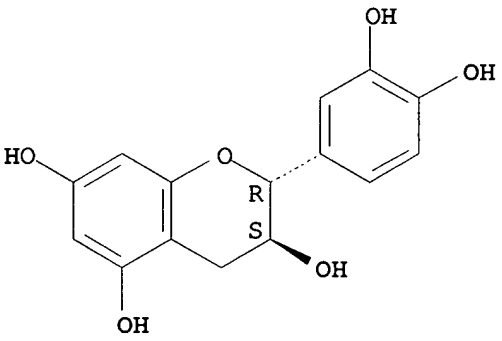
RN 29106-51-2 HCAPLUS
CN [4,8'-Bi-2H-1-benzopyran]-3,3',5,5',7,7'-hexol, 2,2'-bis(3,4-dihydroxyphenyl)-3,3',4,4'-tetrahydro-, (2R,2'R,3S,3'R,4S)- (9CI) (CA INDEX NAME)

Absolute stereochemistry. Rotation (-).



IT **154-23-4P**
RL: PRP (Properties); **RCT (Reactant)**; SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)
(flavan dimers with lipase inhibitory activity from Cassia nomame)
RN 154-23-4 HCAPLUS
CN 2H-1-Benzopyran-3,5,7-triol, 2-(3,4-dihydroxyphenyl)-3,4-dihydro-, (2R,3S)- (9CI) (CA INDEX NAME)

Absolute stereochemistry. Rotation (+).

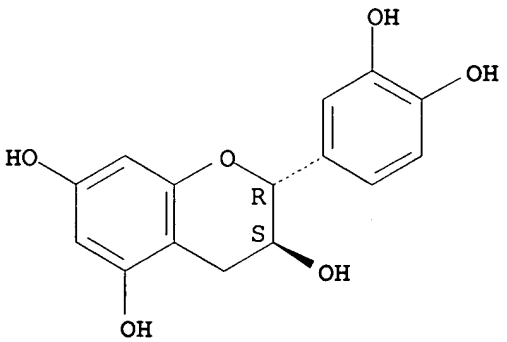


RE.CNT 14 THERE ARE 14 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L20 ANSWER 24 OF 34 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1996:528876 HCAPLUS
DN 125:275499
TI Unambiguous assignments for free dimeric proanthocyanidin phenols from 2D NMR
AU De Bruyne, Tess; Pieters, Luc A. C.; Dommisse, Roger A.; Kolodziej, Herbert; Wray, Victor; Domke, Tobias; Vlietinck, Arnold J.
CS Department Pharmaceutical Sciences, University Antwerp (UIA), Antwerp, B-2610, Belg.
SO Phytochemistry (1996), 43(1), 265-272

CODEN: PYTCAS; ISSN: 0031-9422
PB Elsevier
DT Journal
LA English
AB Characterization of proanthocyanidin **oligomers** proceeds commonly through investigation of NMR data of their peracetates or Me ether acetates, in conjunction with FAB-mass spectrometry and CD. Since such an approach is unsuitable in bioassay-guided isolations, we applied two-dimensional NMR techniques for the identification of dimeric proanthocyanidins. This afforded not only a powerful probe for distinction between the different procyanidin isomers, but also allowed full assignments, even for both major rotameric forms, whenever present, without the need for derivatization. Moreover, discrimination between the crucial 6- and 8-protons and carbons was achieved after addition of traces of cadmium nitrate, resulting in the separation of the broad phenolic signals into sharp singlets. As an example of the general strategy followed in the assignment and combination of data of the different spectra available, complete anal. of underivatized procyanidin B3 or catechin-(4α→8)-catechin is discussed for the first time.
CC 26-9 (Biomolecules and Their Synthetic Analogs)
ST procyanidin B3 prepn NMR; proanthocyanidin phenol dimer NMR
IT Phenols, preparation
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
(dimeric proanthocyanidin)
IT Nuclear magnetic resonance
(unambiguous assignments for free dimeric proanthocyanidin phenols from 2D NMR)
IT 23567-23-9P, **Procyanidin** B3
RL: PRP (Properties); SPN (Synthetic preparation); **PREP (Preparation)**
(unambiguous assignments for free dimeric proanthocyanidin phenols from 2D NMR)
IT **154-23-4**, (+)-**Catechin** 480-18-2, (+)-Taxifolin
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(unambiguous assignments for free dimeric proanthocyanidin phenols from 2D NMR)
IT **154-23-4**, (+)-**Catechin**
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(unambiguous assignments for free dimeric proanthocyanidin phenols from 2D NMR)
RN 154-23-4 HCAPLUS
CN 2H-1-Benzopyran-3,5,7-triol, 2-(3,4-dihydroxyphenyl)-3,4-dihydro-, (2R,3S)- (9CI) (CA INDEX NAME)

Absolute stereochemistry. Rotation (+).



L20 ANSWER 25 OF 34 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1995:973937 HCAPLUS
DN 124:15304
TI Anticariogenic flavonoid polymers, their manufacture, and glucosyltransferase inhibitors, food, and sucrose containing them
IN Abe, Isao; Mitsunaga, Tooru
PA Suntory Ltd, Japan
SO Jpn. Kokai Tokkyo Koho, 7 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI JP 07242556	A2	19950919	JP 1994-62138	19940308
PRAI JP 1994-62138		19940308		

AB Anticariogenic falvonoid polymers with weight average mol. weight 1000-10,000 are prepared by condensation of reduced matters of flavanones or flavanonols or leucoanthocyanidins with catechins. Glucosyltransferase inhibitors, anticariogenic food, and anticariogenic sugars containing the polymers are also claimed. The glucosyltransferase inhibitors are used as anticariogenic agents, mouth sanitary agents, and food additives. Fustin (300 mg) was treated with NaBH4 in EtOH at 25° for 2 h to give 270 mg leucofisetinifin, 90 mg of which in HCl was treated with 15 mg D-(+)-catechin at 25° for 24 h to give 95 mg profisetinidin-type flavonoid polymer (I) with weight average mol. weight 2460 and d.p. 7.2. IC50 value of I against glucosyltransferase was 4.2 μg/mL. I significantly inhibited plaque formation by Streptococcus sobrinus incubated on a slide medium containing I. A dentifrice and a chewing gum, each containing I, were also prepared

IC ICM A61K035-78
ICS A61K035-78; A23G003-30; A23L001-30; A61K007-26; C07G017-00
CC 62-7 (Essential Oils and Cosmetics)
Section cross-reference(s): 17, 26
ST leucofisetinidin catechin condensate glucosyltransferase inhibitor; leucocyanidin catechin condensate glucosyltransferase inhibitor; leucoanthocyanidin catechin condensate glucosyltransferase inhibitor; hydroxyflavonoid catechin condensate glucosyltransferase inhibitor; anticariogenic hydroxyflavonoid catechin condensate prepn; dentifrice anticariogenic hydroxyflavonoid catechin condensate; food anticariogenic hydroxyflavonoid catechin condensate; sugar anticariogenic hydroxyflavonoid catechin condensate
IT **Procyanidins**
RL: BAC (Biological activity or effector, except adverse); BSU (Biological study, unclassified); BUU (Biological use, unclassified); FFD (Food or feed use); IMF (Industrial manufacture); SPN (Synthetic preparation); BIOL (Biological study); **PREP (Preparation)**; USES (Uses)
(**oligomers**; preparation of anticariogenic hydroxyflavonoid-catechin polycondensates as glucosyltransferase inhibitors for dentifrices, food, and sugars)
IT Dentifrices
Food
Mouthwashes
(preparation of anticariogenic hydroxyflavonoid-catechin polycondensates as glucosyltransferase inhibitors for dentifrices, food, and sugars)
IT Flavanols

Leucoanthocyanidins
RL: BAC (Biological activity or effector, except adverse); BSU (Biological study, unclassified); BUU (Biological use, unclassified); FFD (Food or feed use); IMF (Industrial manufacture); SPN (Synthetic preparation); BIOL (Biological study); PREP (Preparation); USES (Uses)
(reaction products with catechins; preparation of anticariogenic hydroxyflavonoid-catechin polycondensates as glucosyltransferase inhibitors for dentifrices, food, and sugars)

IT Flavonoids
RL: BAC (Biological activity or effector, except adverse); BSU (Biological study, unclassified); BUU (Biological use, unclassified); FFD (Food or feed use); IMF (Industrial manufacture); SPN (Synthetic preparation); BIOL (Biological study); PREP (Preparation); USES (Uses)
(profisetinidins, **oligomers**; preparation of anticariogenic hydroxyflavonoid-catechin polycondensates as glucosyltransferase inhibitors for dentifrices, food, and sugars)

IT 154-23-4DP, D-(+)-Catechin, reaction products with leucofisetinidin or leucocyanidin
RL: BAC (Biological activity or effector, except adverse); BSU (Biological study, unclassified); BUU (Biological use, unclassified); FFD (Food or feed use); IMF (Industrial manufacture); SPN (Synthetic preparation); BIOL (Biological study); PREP (Preparation); USES (Uses)
(preparation of anticariogenic hydroxyflavonoid-catechin polycondensates as glucosyltransferase inhibitors for dentifrices, food, and sugars)

IT 9031-48-5, Glucosyltransferase
RL: BPR (Biological process); BSU (Biological study, unclassified); BIOL (Biological study); PROC (Process)
(preparation of anticariogenic hydroxyflavonoid-catechin polycondensates as glucosyltransferase inhibitors for dentifrices, food, and sugars)

IT 57-50-1, Sucrose, biological studies
RL: FFD (Food or feed use); BIOL (Biological study); USES (Uses)
(preparation of anticariogenic hydroxyflavonoid-catechin polycondensates as glucosyltransferase inhibitors for dentifrices, food, and sugars)

IT 480-17-1P, Leucocyanidin 34620-73-0P
RL: **RCT (Reactant)**; SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)
(preparation of anticariogenic hydroxyflavonoid-**catechin** polycondensates as glucosyltransferase inhibitors for dentifrices, food, and sugars)

IT 83-85-2, Fuscin 480-18-2, Taxifolin
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(reduction of; preparation of anticariogenic hydroxyflavonoid-**catechin** polycondensates as glucosyltransferase inhibitors for dentifrices, food, and sugars)

L20 ANSWER 26 OF 34 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1994:630561 HCAPLUS
DN 121:230561
TI Extensive high-resolution reverse 2D NMR analysis for the structural elucidation of procyanidin **oligomers**
AU Balas, Laurence; Vercauteren, Joseph
CS Laboratoire de Pharmacognosie, Universite de Bordeaux II, Bordeaux, 33076, Fr.
SO Magnetic Resonance in Chemistry (1994), 32(7), 386-93
CODEN: MRCHEG; ISSN: 0749-1581
DT Journal
LA English
AB The structures of the procyanidin dimers catechin-(4α-8)-catechin and catechin-(α-6)-catechin were proved by spectroscopic means. To distinguish between the two possible interflavanoid linkages, it is

necessary to assign all the quaternary aromatic carbon signals. How these assignments can be made through two-dimensional NMR spectroscopy is described.

CC 26-9 (Biomolecules and Their Synthetic Analogs)
Section cross-reference(s): 22

ST two dimensional NMR spectra procyanidin **oligomer**; catechin catechin structural elucidation; proanthocyanidin mol structure

IT Molecular structure determination
(NMR spectrometric, high-resolution reverse 2D NMR anal. for the structural elucidation of procyanidin **oligomers**)

IT 12798-58-2P 23567-23-9P 65085-08-7P
RL: PRP (Properties); RCT (Reactant); SPN (Synthetic preparation); **PREP (Preparation)**; RACT (Reactant or reagent)
(high-resolution reverse 2D NMR anal. for the structural elucidation of **procyanidin oligomers**)

IT 21179-22-6P
RL: PRP (Properties); SPN (Synthetic preparation); **PREP (Preparation)**
(high-resolution reverse 2D NMR anal. for the structural elucidation of **procyanidin oligomers**)

IT **154-23-4**, (+)-**Catechin** 480-18-2, Taxifolin
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(high-resolution reverse 2D NMR anal. for the structural elucidation of procyanidin **oligomers**)

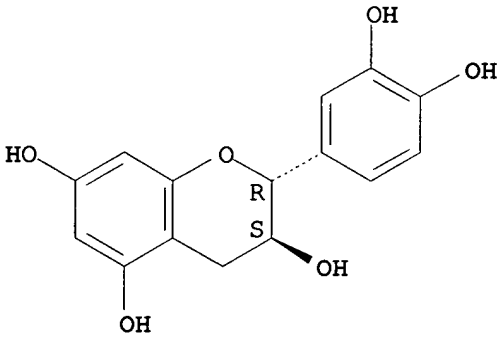
IT 37064-31-6P 78392-24-2P
RL: SPN (Synthetic preparation); PREP (Preparation)
(preparation of)

IT **154-23-4**, (+)-**Catechin**
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(high-resolution reverse 2D NMR anal. for the structural elucidation of procyanidin **oligomers**)

RN 154-23-4 HCAPLUS

CN 2H-1-Benzopyran-3,5,7-triol, 2-(3,4-dihydroxyphenyl)-3,4-dihydro-, (2R,3S)- (9CI) (CA INDEX NAME)

Absolute stereochemistry. Rotation (+).



L20 ANSWER 27 OF 34 HCAPLUS COPYRIGHT 2006 ACS on STN

AN 1993:17865 HCAPLUS

DN 118:17865

TI proanthocyanidin **oligomers** as antimutagens

IN Sugimoto, Katsutoshi; Ariga, Toshiaki; Oshita, Katsunori; Kikuchi, Mamoru

PA Kikkoman Corp., Japan

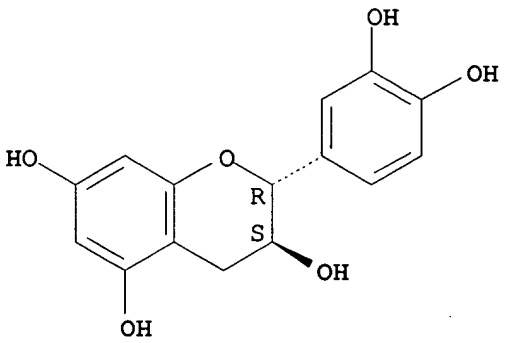
SO Jpn. Kokai Tokkyo Koho, 6 pp.
CODEN: JKXXAF

DT Patent
LA Japanese
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 04190774	A2	19920709	JP 1990-317721	19901126
	JP 2857646	B2	19990217		
PRAI	JP 1990-317721		19901126		

OS MARPAT 118:17865
AB Antimutagens contain proanthocyanidin **oligomers** as active ingredients. Grape seeds (1 kg) were extracted with H2O at 85° for 2 h, and the extract was separated and chromatographed to give 157 mg procyanidin tetramer. An aqueous solution (50 μL) of 33 ng Trp P-2 (a mutagen in foods) was incubated with 50 μL of the procyanidin tetramer (125 mg/plate), 500 μL of a supernatant of rat liver homogenate, and 100 μL of Salmonella typhymurium TA98 culture at 37° for 20 min and then cultured in an agar medium at 37° for 48 h. The mutagenicity of Trp P-2 was inhibited by 94%.
IC ICM A23L003-3544
ICS C07D311-28; C07D311-62; C09K015-08; C11B005-00
CC 4-6 (Toxicology)
Section cross-reference(s): 17
ST antimutagen proanthocyanidin **oligomer** Trp P1; mutagen inhibitor proanthocyanidin **oligomer**
IT Procyanidins
RL: BIOL (Biological study)
(**oligomers**, antimutagens containing, for foods)
IT Proanthocyanidins
RL: BIOL (Biological study)
(**oligomers**, as antimutagens)
IT Mutation inhibitors
Neoplasm inhibitors
(proanthocyanidin **oligomers** as)
IT 29106-51-2, Procyanidin B4 102491-63-4
RL: BIOL (Biological study)
(antimutagen)
IT 62450-07-1, Trp P-2
RL: BIOL (Biological study)
(antimutagens containing proanthocyanidin **oligomers** for)
IT 23567-23-9P, **Procyanidin** B3
RL: SPN (Synthetic preparation); **PREP (Preparation)**
(preparation and antimutagenicity of)
IT 24198-97-8
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(reaction of, with **catechin**)
IT **154-23-4**, (+)-**Catechin**
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(reaction of, with dihydroquercetin)
IT **154-23-4**, (+)-**Catechin**
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(reaction of, with dihydroquercetin)
RN 154-23-4 HCAPLUS
CN 2H-1-Benzopyran-3,5,7-triol, 2-(3,4-dihydroxyphenyl)-3,4-dihydro-, (2R,3S)- (9CI) (CA INDEX NAME)

Absolute stereochemistry. Rotation (+).



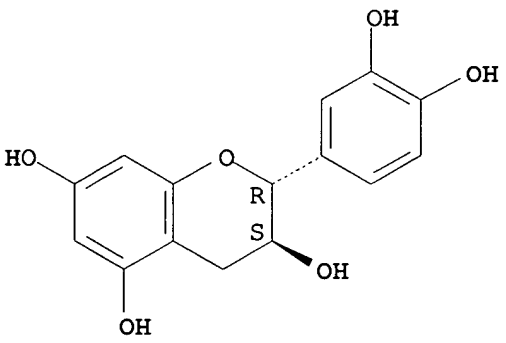
L20 ANSWER 28 OF 34 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1988:590122 HCAPLUS
DN 109:190122
TI Preparation of grape flavonoid-phospholipid complexes as vascular-protective and antiinflammatory agents.
IN Bombardelli, Ezio; Sabadie, Michel
PA Indena S.p.A., Italy; SANOFI
SO Eur. Pat. Appl., 10 pp.
CODEN: EPXXDW
DT Patent
LA French
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 275224	A2	19880720	EP 1988-400052	19880111
	EP 275224	A3	19890927		
	EP 275224	B1	19930721		
	R: AT, BE, CH, DE, ES, FR, GB, GR, IT, LI, LU, NL, SE				
	AT 91688	E	19930815	AT 1988-400052	19880111
	ES 2056943	T3	19941016	ES 1988-400052	19880111
	JP 01013031	A2	19890117	JP 1988-6759	19880113
	JP 06076335	B4	19940928		
	CA 1337604	A1	19951121	CA 1988-556423	19880113
	US 4963527	A	19901016	US 1988-143764	19880114
PRAI	IT 1987-19084	A	19870114		
	EP 1988-400052	A	19880111		

OS MARPAT 109:190122
AB Complexes (I) of procyanidol **oligomers** with ROCH2CH(OR1)CH2OP(O)(OH)OR2 (II; R, R1 = fatty acyl; R2 = aliphatic aminoalc. residue) were prepared Grape extract (10 g)(preparation described elsewhere) and 15 g 95% soya phosphatidylcholine were dissolved in 250 mL CH2Cl2 containing 5% MeOH, the solvent evaporated, and the residue dissolved in 300 mL CH2Cl2. The latter was reduced to 50 mL and added to 300 mL hexane to give 23 g complex (III) which, at 200 (units not given), gave 30.69% inhibition of histamine capillary permeability in the rat. Tablets were prepared each containing III 250, cellulose 118, silica 3, Mg stearate 4, methacrylate anionic polymer 12, talc 8, MgCO3 8, starch 5, and gum arabic 159 mg.
IC ICM C07F009-10
ICS C07H017-065; A61K031-70; A61K031-685; A61K007-48
CC 26-4 (Biomolecules and Their Synthetic Analogs)
Section cross-reference(s): 1, 63
ST flavonoid phospholipid complex prepn vascular protective; phospholipid flavonoid complex prepn antiinflammatory

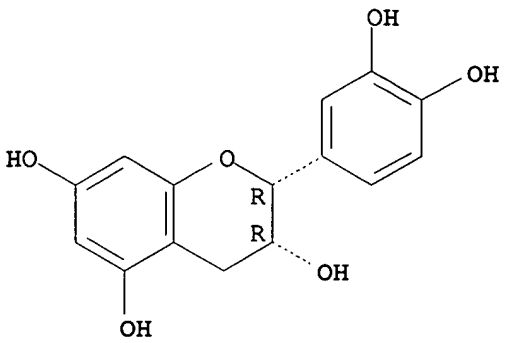
IT Inflammation inhibitors
(flavonoid phospholipid complexes)
IT **Procyanidins**
RL: SPN (Synthetic preparation); **PREP (Preparation)**
(**oligomeric**, phosphatidylcholine complexes, preparation of, as vascular protective and antiinflammatory agent)
IT Blood vessel
(protectants for, flavonoid phospholipid complexes as)
IT **154-23-4**
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(complex formation with distearoylphosphatidylcholine)
IT **490-46-0** 20315-25-7
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(complex formation with soya lecithin)
IT 490-46-0DP, complex with soya lecithin 20315-25-7DP, complex with soya phosphatidylcholine
RL: PREP (Preparation)
(preparation of, as NMR model compound)
IT 117285-17-3P
RL: SPN (Synthetic preparation); PREP (Preparation)
(preparation of, as NMR model compound)
IT 4539-70-2DP, compound with **procyanidin oligomers**
RL: **PREP (Preparation)**
(preparation of, as vascular protective and antiinflammatory agent)
IT **154-23-4**
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(complex formation with distearoylphosphatidylcholine)
RN 154-23-4 HCAPLUS
CN 2H-1-Benzopyran-3,5,7-triol, 2-(3,4-dihydroxyphenyl)-3,4-dihydro-, (2R,3S)- (9CI) (CA INDEX NAME)

Absolute stereochemistry. Rotation (+).

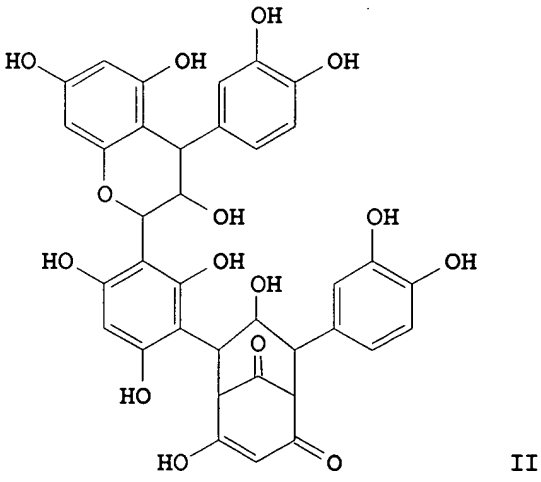


IT **490-46-0**
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(complex formation with soya lecithin)
RN 490-46-0 HCAPLUS
CN 2H-1-Benzopyran-3,5,7-triol, 2-(3,4-dihydroxyphenyl)-3,4-dihydro-, (2R,3R)- (9CI) (CA INDEX NAME)

Absolute stereochemistry. Rotation (-).



L20 ANSWER 29 OF 34 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1988:150083 HCAPLUS
DN 108:150083
TI Condensed tannins. Base-catalyzed reactions of polymeric procyanidins with phloroglucinol: intramolecular rearrangements
AU Laks, Peter E.; Hemingway, Richard W.; Conner, Anthony H.
CS South. For. Exp. Stn., For. Serv., Pineville, LA, 71360, USA
SO Journal of the Chemical Society, Perkin Transactions 1: Organic and Bio-Organic Chemistry (1972-1999) (1987), (9), 1875-81
CODEN: JCPRB4; ISSN: 0300-922X
DT Journal
LA English
OS CASREACT 108:150083
GI

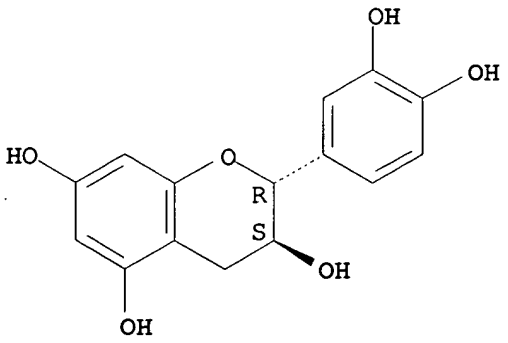


II

AB Reactions of polymeric procyanidins with phloroglucinol at pH 12.0 and 23 or 50° gave epicatechin-(4β)-phloroglucinol (I), by cleavage of the interflavanoid bond between procyanidin units with subsequent addition of phloroglucinol, and (+)-catechin from the terminal unit. I rearranged to 8-(3,4-dihydroxyphenyl)-7-hydroxy-6-(2,4,6-trihydroxyphenyl)bicyclo[3.3.1]nonane-2,4,9-trione. Rearrangement of a dimeric procyanidin-phloroglucinol adduct gave flavan II. Catechin, from the terminal unit, gave catechinic acid, an enolic form of

6-(3,4-dihydroxyphenyl)-7-hydroxybicyclo[3.3.1]nonane-2,4,9-trione.
CC 26-4 (Biomolecules and Their Synthetic Analogs)
ST procyanidin polymer phloroglucinol reaction; bicyclononanetrione hydroxyphenyl; bicyclononanylflavan; flavan trioxobicyclononanyl
IT Tannins
RL: RCT (Reactant); RACT (Reactant or reagent)
(condensed, base-catalyzed reaction of, with phloroglucinol)
IT Rearrangement
(intramol., of procyanidin-phloroglucinol adducts)
IT Procyanidins
RL: RCT (Reactant); RACT (Reactant or reagent)
(polymers, base-catalyzed reaction of, with phloroglucinol)
IT 55626-36-3 113638-72-5 113667-97-3
RL: PRP (Properties)
(carbon-13 NMR of)
IT 50423-77-3P 113547-42-5P 113638-69-0P
RL: FORM (Formation, nonpreparative); **PREP (Preparation)**
(formation of, in reaction of phloroglucinol with polymeric **procyanidins**)
IT 113638-70-3P
RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)
(preparation and **acetylation** of)
IT 113547-43-6P 113638-71-4P
RL: SPN (Synthetic preparation); PREP (Preparation)
(preparation of)
IT **154-23-4**, (+)-**Catechin**
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(reaction of, with phloroglucinol)
IT 108-73-6, Phloroglucinol
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(reaction of, with tannins and **catechin**)
IT **154-23-4**, (+)-**Catechin**
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(reaction of, with phloroglucinol)
RN 154-23-4 HCAPLUS
CN 2H-1-Benzopyran-3,5,7-triol, 2-(3,4-dihydroxyphenyl)-3,4-dihydro-, (2R,3S)- (9CI) (CA INDEX NAME)

Absolute stereochemistry. Rotation (+).



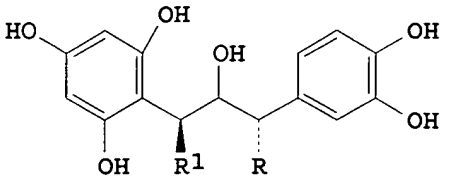
L20 ANSWER 30 OF 34 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1987:636277 HCAPLUS
DN 107:236277
TI Condensed tannins: base-catalysed reactions of polymeric procyanidins

with toluene-α-thiol. Lability of the interflavanoid bond and pyran ring

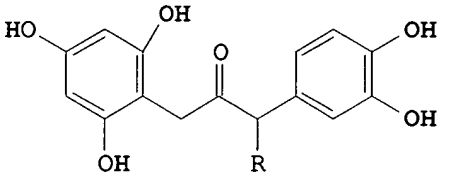
AU Laks, Peter E.; Hemingway, Richard W.
CS South. For. Exp. Stn., For. Serv., Pineville, LA, 71360, USA

SO Journal of the Chemical Society, Perkin Transactions 1: Organic and Bio-Organic Chemistry (1972-1999) (1987), (3), 465-70
CODEN: JCPRB4; ISSN: 0300-922X
DT Journal
LA English
OS CASREACT 107:236277

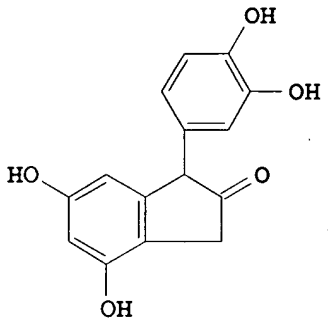
GI



I



II



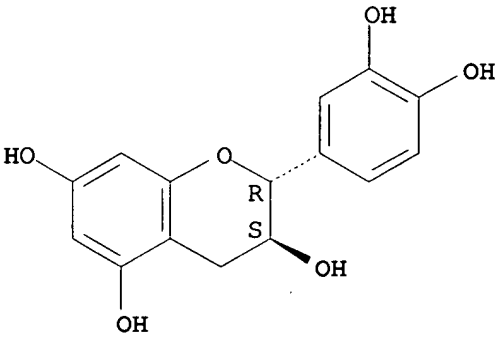
III

AB Reaction of polymeric procyanidins (condensed tannins) with PhCH2SH at pH 12.0 and 23° gave 1 major stereoisomer of bis(benzylthio)diphenylpropanol I (R = R1 = PhCH2S) via an intermediate quinone methide. Two isomers of I (R = SCH2Ph, R1 = H) were obtained by reaction at the C(2) of the terminal catechin units. At higher temps., I (R = R1 = SCH2Ph) loss PhCH2SH at C(1) to give propanone II (R = CH2Ph) via tautomeric rearrangement of the quinone methide to an enol. Loss of PhCH2SH from I (R = SCH2Ph, R1 = H) gave II (R = H). II (R = H) further rearranges to indanone III.

CC 26-4 (Biomolecules and Their Synthetic Analogs)
Section cross-reference(s): 43
ST procyanidin degrdn alk benzyl mercaptan; tannin degrdn alk benzyl mercaptan; catechin ring cleavage benzyl mercaptan; propanone benzylthiodiphenyl; propanol benzylthiodiphenyl prepn redn; indanone dihydroxyphenyldihydroxy; hydroxyphenylpropane prepn rearrangement
IT Procyanidins
Tannins
RL: RCT (Reactant); RACT (Reactant or reagent)
(of loblolly pine, reaction of, with alkyline benzyl mercaptan)
IT 76252-38-5P 111397-01-4P 111421-89-7P
RL: RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)
(isolation and Raney nickel reduction of)
IT 111396-99-7P 111397-00-3P
RL: SPN (Synthetic preparation); PREP (Preparation)
(preparation of)

IT 92550-62-4P 98900-31-3P 111396-98-6P
RL: SPN (Synthetic preparation); **PREP (Preparation)**
(preparation of, from **procyanidins** and alkaline benzyl mercaptan)
IT **154-23-4**, (+)-**Catechin**
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(reaction of, with alkaline benzyl mercaptan)
IT **154-23-4**, (+)-**Catechin**
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(reaction of, with alkaline benzyl mercaptan)
RN 154-23-4 HCAPLUS
CN 2H-1-Benzopyran-3,5,7-triol, 2-(3,4-dihydroxyphenyl)-3,4-dihydro-, (2R,3S)- (9CI) (CA INDEX NAME)

Absolute stereochemistry. Rotation (+).



L20 ANSWER 31 OF 34 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1987:66953 HCAPLUS
DN 106:66953
TI Direct synthesis of the barley proanthocyanidins prodelphinidin B3, prodelphinidin C2, and two trimeric proanthocyanidins with a mixed prodelphinidin-procyanidin stereochemistry
AU Delcour, Jan A.; Vercruysse, Sabine A. R.
CS Lab. Toegepaste Org. Scheikd., Kathol. Univ. Leuven, Heverlee, B-3030, Belg.
SO Journal of the Institute of Brewing (1986), 92(3), 244-9
CODEN: JINBAL; ISSN: 0368-2587
DT Journal
LA English
AB Reduced (+)-dihydromyricetin and/or reduced (+)-dihydroquercetin have been condensed with (+)-catechin to give the following all-trans-products: prodelphinidin B3, prodelphinidin C2, (4,8:4,8)-(+)-gallocatechin-(+)-catechin-(+)-catechin, and (4,8:4,8)-(+)-catechin-(+)-gallocatechin-(+)-catechin. 1H NMR spectra of the acetates are presented in favor of the above structures, the interpretation being simplified by inspection of the 1H NMR data of the acetates of procyanidin B3, procyanidin B6, and procyanidin C2.
CC 26-4 (Biomolecules and Their Synthetic Analogs)
ST prodelphinidin B3 C2 structure; proanthocyanidin trimer prepn structure
IT Molecular structure, natural product
(of barley proanthocyanidin trimers)
IT Proanthocyanidins
RL: SPN (Synthetic preparation); PREP (Preparation)
(trimers, preparation and mol. structure of)
IT 21179-22-6P, **Procyanidin** B3 peracetate 65085-08-7P, **Procyanidin** B6 peracetate 68964-87-4P 78392-24-2P,

Procyanidin C2 peracetate 106325-69-3P 106325-70-6P
106325-71-7P, Prodelphinidin C2 peracetate
RL: PRP (Properties); SPN (Synthetic preparation); **PREP (Preparation)**
(preparation and NMR of)

IT 12798-58-2P, **Procyanidin** B6 23567-23-9P, **Procyanidin** B3 37064-31-6P, **Procyanidin** C2 79127-37-0P 79136-97-3P 87421-89-4P
RL: RCT (Reactant); SPN (Synthetic preparation); **PREP (Preparation)**; RACT (Reactant or reagent)
(preparation and **acetylation** of)

IT 78362-05-7P
RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)
(preparation and reaction of, with dihydroquercetin)

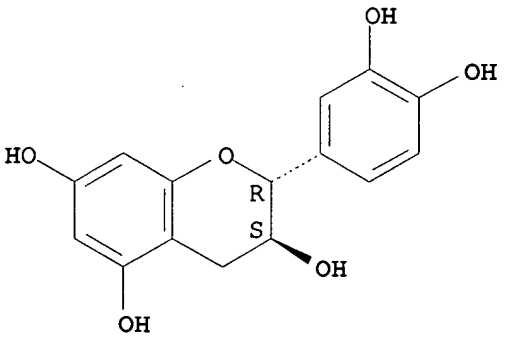
IT 480-18-2, (+)-Dihydroquercetin 27200-12-0, (+)-Dihydromyricetin
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(reaction of, with **catechin**)

IT **154-23-4**, (+)-**Catechin**
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(reaction of, with dihydroquercetin)

IT **154-23-4**, (+)-**Catechin**
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(reaction of, with dihydroquercetin)

RN 154-23-4 HCAPLUS
CN 2H-1-Benzopyran-3,5,7-triol, 2-(3,4-dihydroxyphenyl)-3,4-dihydro-, (2R,3S)- (9CI) (CA INDEX NAME)

Absolute stereochemistry. Rotation (+).



L20 ANSWER 32 OF 34 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1987:4713 HCAPLUS
DN 106:4713
TI Synthesis and characterization of procyanidin dimers as their peracetates and octamethyl ether diacetates
AU Kolodziej, Herbert
CS Inst. Pharm. Biol. Phytochem., Westfael. Wilhelms-Univ., Muenster, D-4400, Fed. Rep. Ger.
SO Phytochemistry (1986), 25(5), 1209-15
CODEN: PYTCAS; ISSN: 0031-9422
DT Journal
LA English
GI

* STRUCTURE DIAGRAM TOO LARGE FOR DISPLAY - AVAILABLE VIA OFFLINE PRINT *

AB Condensation of (2R,3S,4R or S)-leucocyanidin or the 5,7,3',4'-tetramethyl ether of (2R,3R,4S)-leucocyanidin with flavan-3-ols yielded dimeric flavanoids which were converted to their octamethyl ether diacetates, or the decaacetates. Comparison is made of the 1H NMR spectra of the decaacetate and octamethyl ether diacetate derivs. which leads to useful diagnostic shift parameters characteristic of their structures. Condensations afforded the novel biflavanoid I with a 3,4-cis-configuration and a triflavanoid II of 'mixed' stereochem.

CC 26-4 (Biomolecules and Their Synthetic Analogs)

ST leucocyanidin flavanol condensation; procyanidin dimer prepn NMR

IT Nuclear magnetic resonance
(of procyanidin dimers)

IT Flavonoids
RL: SPN (Synthetic preparation); **PREP (Preparation)**
(**procyanidin** dimers, preparation and NMR characterization of)

IT 17941-25-2P 17947-27-2P 21179-20-4P 21179-21-5P 21179-22-6P 21179-23-7P 28699-22-1P 65052-97-3P 65085-08-7P 67253-08-1P 82916-99-2P 97233-62-0P 105504-86-7P 105561-67-9P 105561-68-0P 105561-91-9P
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)
(preparation and NMR of)

IT 37064-32-7P 37064-34-9P 105487-43-2P 105487-44-3P 105561-62-4P 105561-63-5P 105561-64-6P 105561-65-7P
RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)
(preparation and **acetylation** of)

IT 69256-15-1P 105561-66-8P
RL: SPN (Synthetic preparation); PREP (Preparation)
(preparation of)

IT 79813-67-5P
RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)
(preparation, methylation, and **acetylation** of)

IT 22970-70-3 93527-39-0
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(reaction of, with **catechin**)

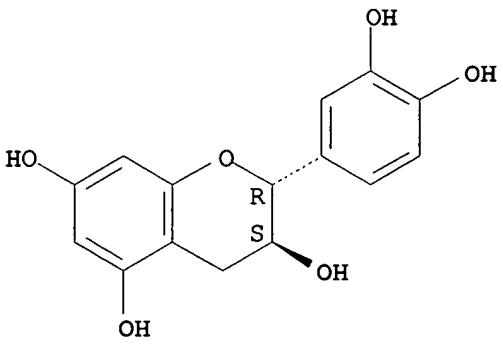
IT **154-23-4**, (+)-**Catechin 490-46-0**, (-)-**Epicatechin**
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(reaction of, with flavandiols)

IT **154-23-4**, (+)-**Catechin 490-46-0**, (-)-**Epicatechin**
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(reaction of, with flavandiols)

RN 154-23-4 HCAPLUS

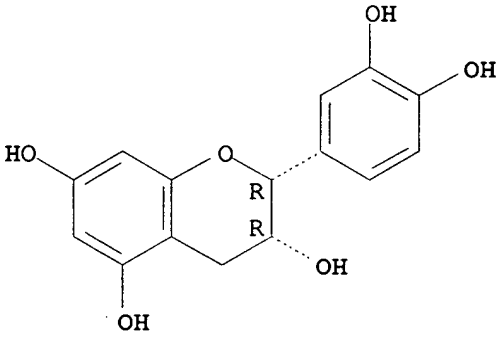
CN 2H-1-Benzopyran-3,5,7-triol, 2-(3,4-dihydroxyphenyl)-3,4-dihydro-, (2R,3S)- (9CI) (CA INDEX NAME)

Absolute stereochemistry. Rotation (+).



RN 490-46-0 HCAPLUS
CN 2H-1-Benzopyran-3,5,7-triol, 2-(3,4-dihydroxyphenyl)-3,4-dihydro-, (2R,3R)- (9CI) (CA INDEX NAME)

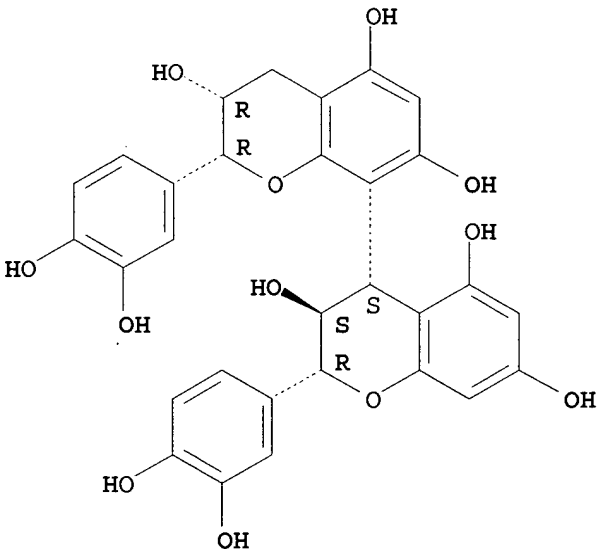
Absolute stereochemistry. Rotation (-).



L20 ANSWER 33 OF 34 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1985:504769 HCAPLUS
DN 103:104769
TI Synethsis of condensed tannins. Part 13. The first 2,3-trans-3,4-cis-procyanidins: sequence of units in a trimer of mixed stereochemistry
AU Delcour, Jan A.; Serneels, Edward J.; Ferreira, Daneel; Roux, David G.
CS Lab. Toegepaste Org. Scheikd., Kathol. Univ. Leuven, Heverlee, B-3030, Belg.
SO Journal of the Chemical Society, Perkin Transactions 1: Organic and Bio-Organic Chemistry (1972-1999) (1985), (4), 669-76
CODEN: JCPRB4; ISSN: 0300-922X
DT Journal
LA English
OS CASREACT 103:104769
AB Condensation of (+)-leucocyanidin with (-)-epicatechin initiated a succession of substitutions leading mainly to the introduction of [4,8]-2,3-trans-3,4-trans-procyanidin units and the incorporation of terminal moieties having a 3,4-cis-procyanidin configuration. The bonding in the products and the sequence of units in a trimer of mixed stereochem. were resolved by 1H NMR techniques.
CC 26-9 (Biomolecules and Their Synthetic Analogs)
ST leucocyanidin condensation epicatechin
IT Tannins
RL: SPN (Synthetic preparation); **PREP (Preparation)**

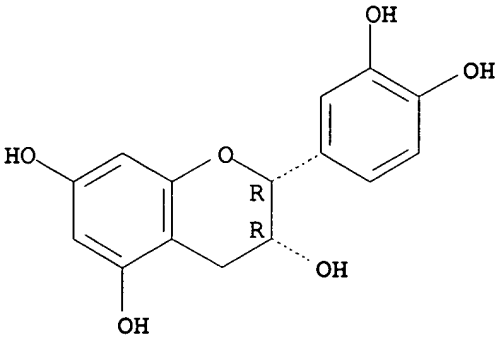
(**procyanidins**, preparation of)
IT 12798-60-6P **29106-51-2P** 51196-38-4P 97233-64-2P
97233-66-4P 97233-68-6P
RL: RCT (Reactant); SPN (Synthetic preparation); **PREP (Preparation)**; RACT (Reactant or reagent)
(preparation and methylation and **acetylation** of)
IT 17947-27-2P 97184-41-3P 97184-42-4P 97233-62-0P 97233-63-1P
97233-65-3P 97233-67-5P 97233-69-7P
RL: SPN (Synthetic preparation); PREP (Preparation)
(preparation of)
IT **490-46-0**
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(reductive coupling of, with dihydroquercetin)
IT 480-18-2
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(reductive coupling of, with **epicatechin**)
IT **29106-51-2P**
RL: RCT (Reactant); SPN (Synthetic preparation); **PREP (Preparation)**; RACT (Reactant or reagent)
(preparation and methylation and **acetylation** of)
RN 29106-51-2 HCAPLUS
CN [4,8'-Bi-2H-1-benzopyran]-3,3',5,5',7,7'-hexol, 2,2'-bis(3,4-dihydroxyphenyl)-3,3',4,4'-tetrahydro-, (2R,2'R,3S,3'R,4S)- (9CI) (CA INDEX NAME)

Absolute stereochemistry. Rotation (-).

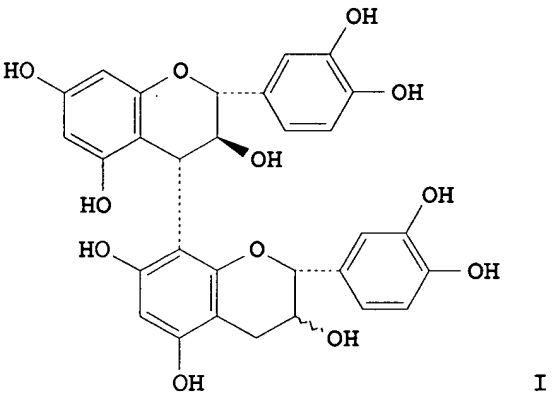


IT **490-46-0**
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(reductive coupling of, with dihydroquercetin)
RN 490-46-0 HCAPLUS
CN 2H-1-Benzopyran-3,5,7-triol, 2-(3,4-dihydroxyphenyl)-3,4-dihydro-, (2R,3R)- (9CI) (CA INDEX NAME)

Absolute stereochemistry. Rotation (-).



L20 ANSWER 34 OF 34 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1984:120725 HCAPLUS
DN 100:120725
TI Synthesis and characterization of dimers of catechin and epicatechin
AU Fonknechten, G.; Moll, M.; Cagniant, D.; Kirsch, G.; Muller, J. F.
CS Res. Cent., TEPRAL, Champigneulles, F-54250, Fr.
SO Journal of the Institute of Brewing (1983), 89(6), 424-31
CODEN: JINBAL; ISSN: 0368-2587
DT Journal
LA English
GI

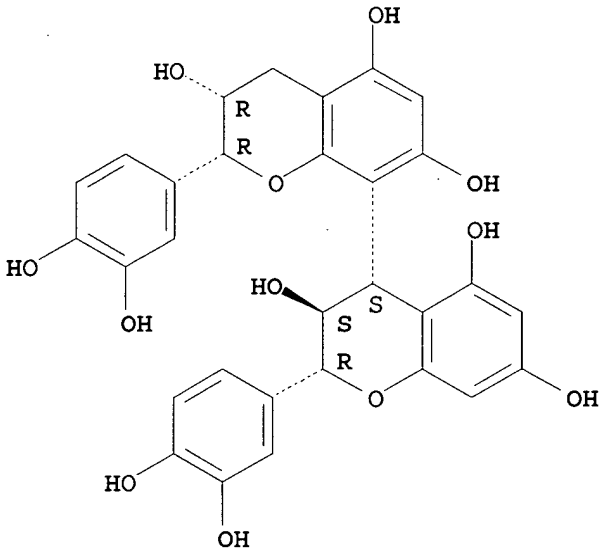


I

AB The dimers I were prepared in 50% yields by treating dihydroquercetin with catechin or epicatechin in the presence of NaBH4 in excess H2O, followed by acidification with 37% HCl. The decaacetyl derivs. of I, tetra-O-methylcatechin, and tetra-O-methylepicatechin were prepared for NMR and mass spectral characterization. The spectra are discussed.
CC 26-4 (Biomolecules and Their Synthetic Analogs)
Section cross-reference(s): 22
ST procyanidin B prepn spectra; NMR procyanidin B; mass spectra procyanidin B
IT Mass spectra
(of procyanidins B3 and B4)
IT Nuclear magnetic resonance
(of proton and carbon-13 in procyanidins B3 and B4)
IT 23567-23-9P **29106-51-2P**
RL: RCT (Reactant); SPN (Synthetic preparation); **PREP**

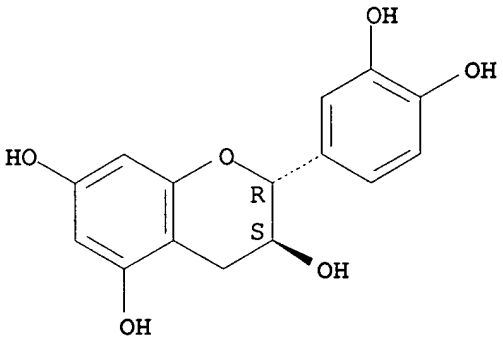
(Preparation); RACT (Reactant or reagent)
(preparation and **acetylation** of)
IT 21179-22-6P 21179-23-7P 23567-23-9P **29106-51-2P**
51079-25-5P 51196-02-2P
RL: PRP (Properties); SPN (Synthetic preparation); **PREP**
(Preparation)
(preparation and spectra of)
IT 480-18-2
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(reaction of, with **catechin**)
IT **154-23-4 490-46-0**
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(reaction of, with dihydroquercetin)
IT **29106-51-2P**
RL: RCT (Reactant); SPN (Synthetic preparation); **PREP**
(Preparation); RACT (Reactant or reagent)
(preparation and **acetylation** of)
RN 29106-51-2 HCAPLUS
CN [4,8'-Bi-2H-1-benzopyran]-3,3',5,5',7,7'-hexol, 2,2'-bis(3,4-dihydroxyphenyl)-3,3',4,4'-tetrahydro-, (2R,2'R,3S,3'R,4S)- (9CI) (CA INDEX NAME)

Absolute stereochemistry. Rotation (-).



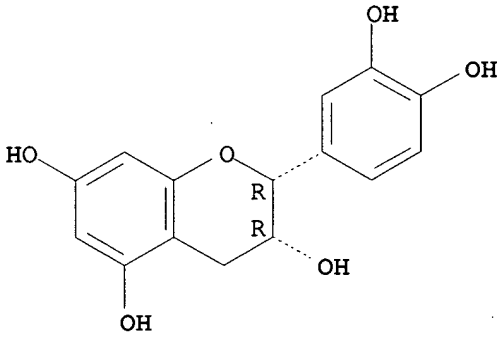
RL: PRP (Properties); SPN (Synthetic preparation); **PREP**
(Preparation)
(prepn. and spectra of
IT **154-23-4 490-46-0**
RL: **RCT (Reactant)**; RACT (Reactant or reagent)
(reaction of, with dihydroquercetin)
RN 154-23-4 HCAPLUS
CN 2H-1-Benzopyran-3,5,7-triol, 2-(3,4-dihydroxyphenyl)-3,4-dihydro-, (2R,3S)- (9CI) (CA INDEX NAME)

Absolute stereochemistry. Rotation (+).



RN 490-46-0 HCAPLUS
CN 2H-1-Benzopyran-3,5,7-triol, 2-(3,4-dihydroxyphenyl)-3,4-dihydro-, (2R,3R)- (9CI) (CA INDEX NAME)

Absolute stereochemistry. Rotation (-).



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